

QUALIFICATION OF MARKET OPPORTUNITIES FOR
ELECTRONIC DATA SYSTEMS CORPORATION

NOVEMBER 4, 1987

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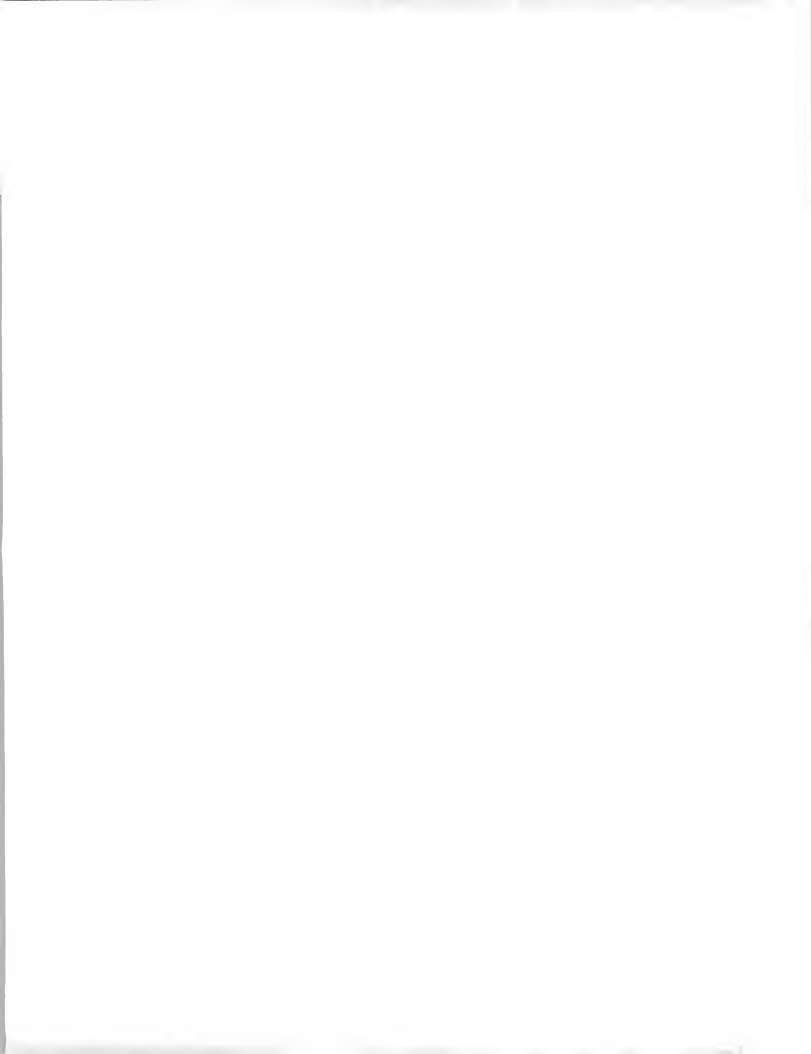
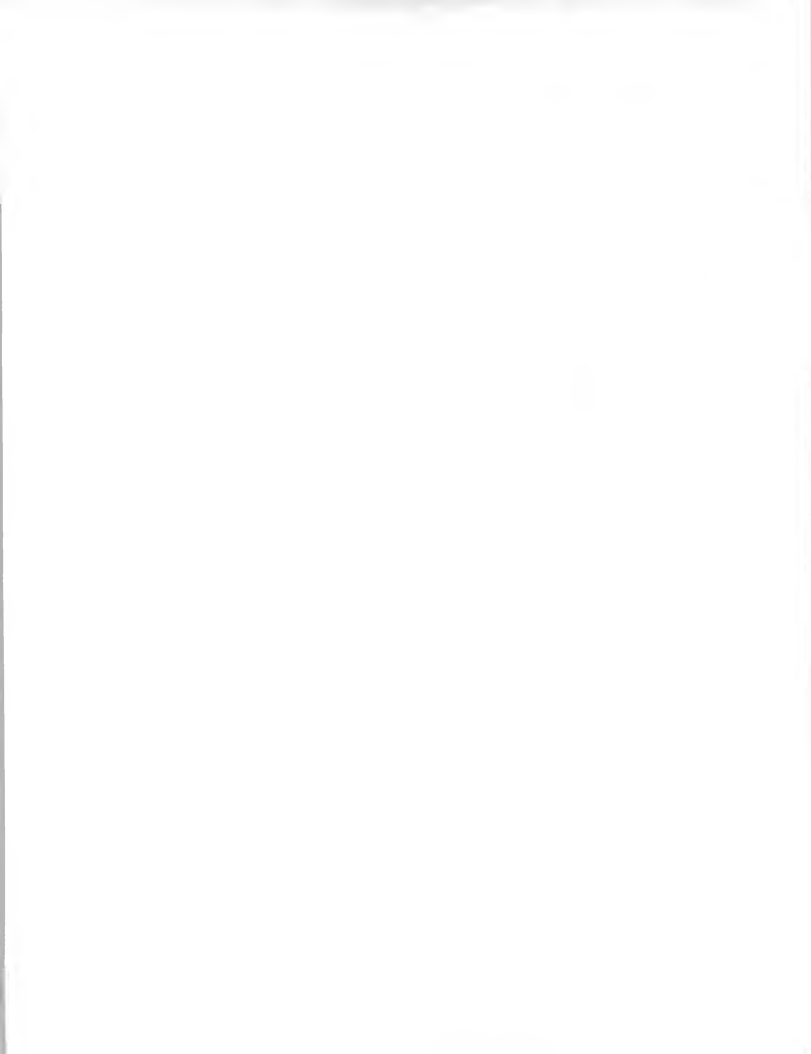


TABLE OF CONTENTS

- I Introduction
- II Executive Summary and Recommendations
- III Utilities Industry Sector
- IV Transportation/Lodging Industry Sector
- V Retail Industry Sector
- VI Wholesale Distribution Industry Sector



I INTRODUCTION

This project qualifies opportunities for EDS in the following market segments:

- Utilities (power and gas).
- Transportation/Lodging (Travel Services).
- Retailing.
- Distribution (wholesale).

We have concentrated on identifying computer/communication needs in the target industries. In particular, communication services' needs have been addressed within each industry sector.

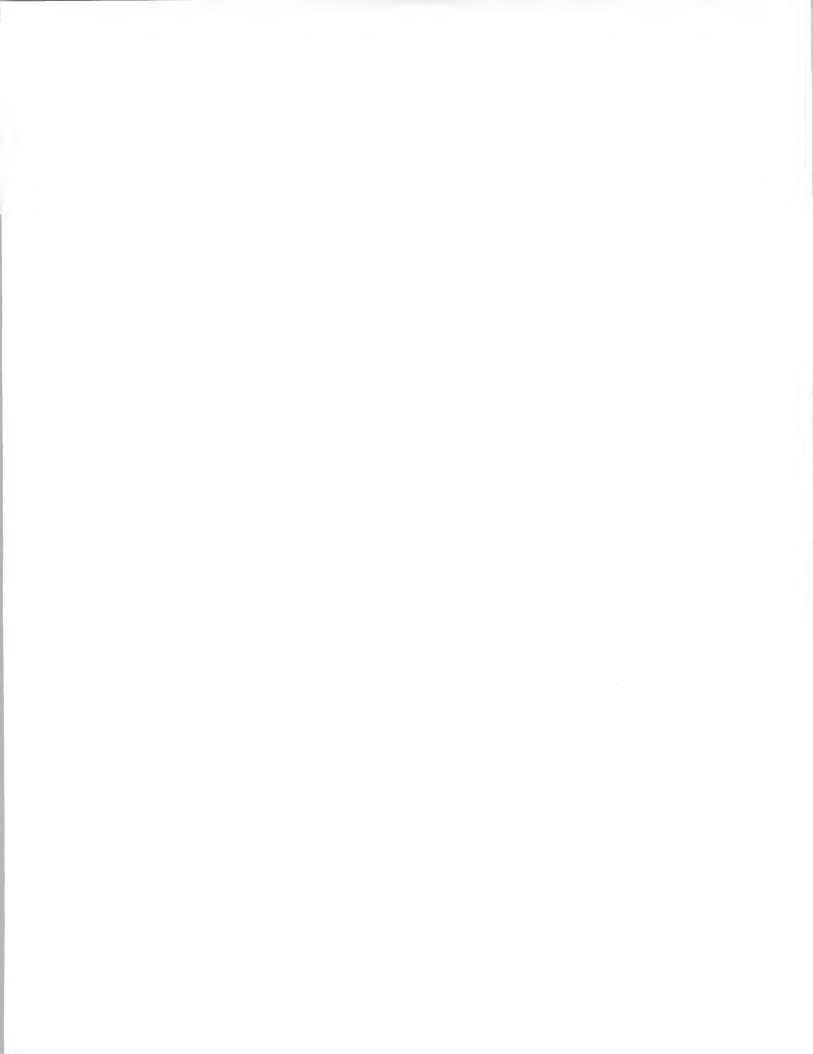
Due to the nature of the project (i.e., support of next year's sales/marketing activities), emphasis has been on immediate opportunities and not those requiring extensive investment or development.

Also, because of EDS's capabilities and position, emphasis has been placed on large contract opportunities as opposed to those derived from the accumulation of many small contracts.

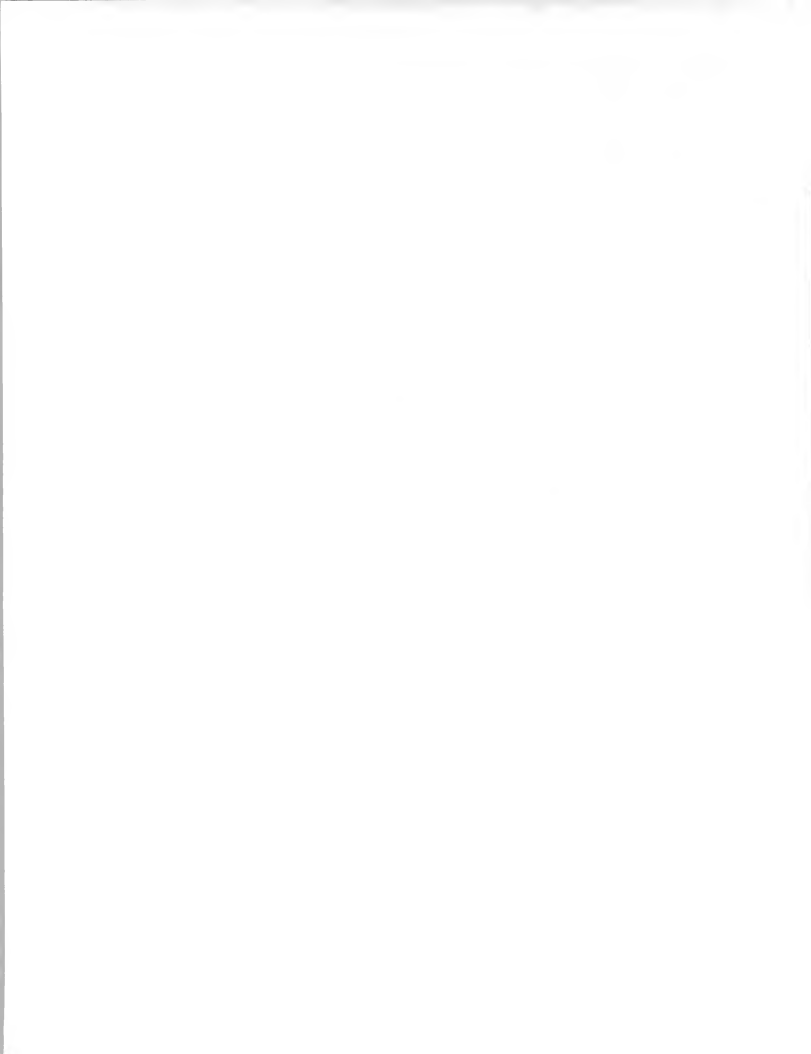
This project was carried out in the following manner:

- INPUT studies and available data were reviewed.
- Internal INPUT staff knowledge was obtained.
- External reviews were carried out with several knowledgeable experts.

The information so obtained was analyzed and structured into this report which is organized as follows:



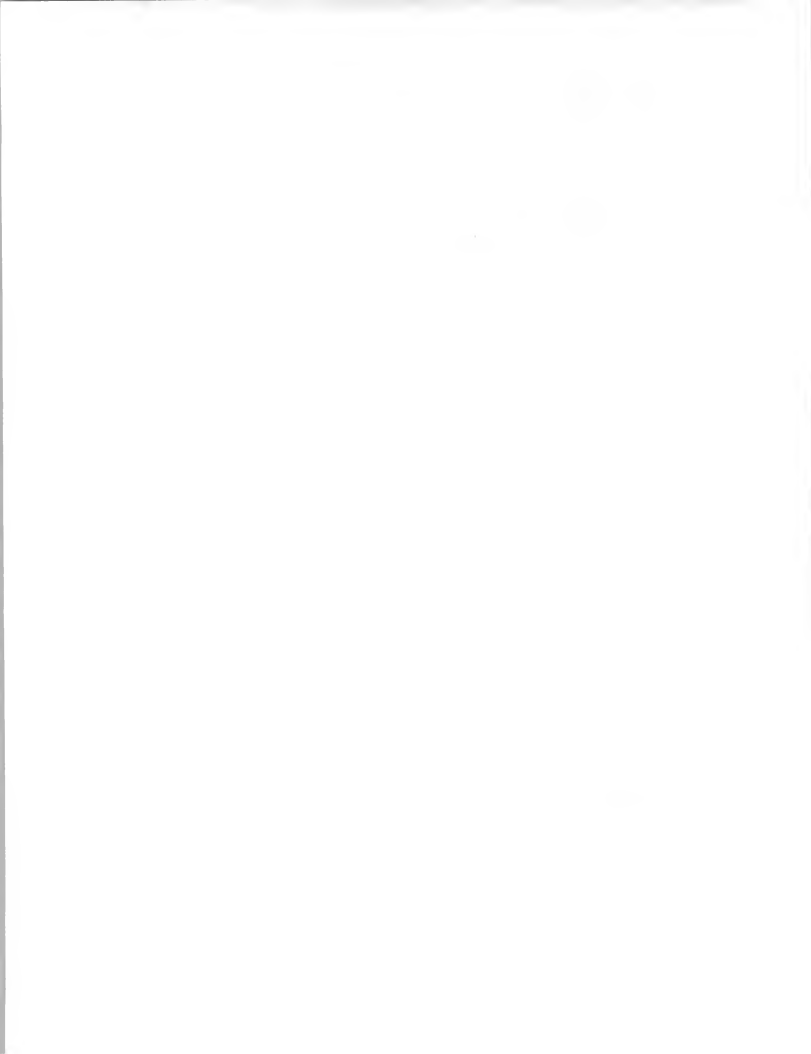
- 1 Introduction.
- 2 Executive Summary and Recommendations.
- 3-6 Industry Sector Analysis.
 - Industry Environment and Demographics; includes analysis of the sector as it affects the opportunities for EDS.
 - Application Needs; includes industry specific and cross-industry needs as they apply to this sector. Particular coverage of integrating functions across industries. Coverage of communication/computer systems development and operations needs. Only identifies targets that make sense for EDS.
 - Approaches for EDS; suggesting types of companies and specific marketing approaches, concentration points, etc.



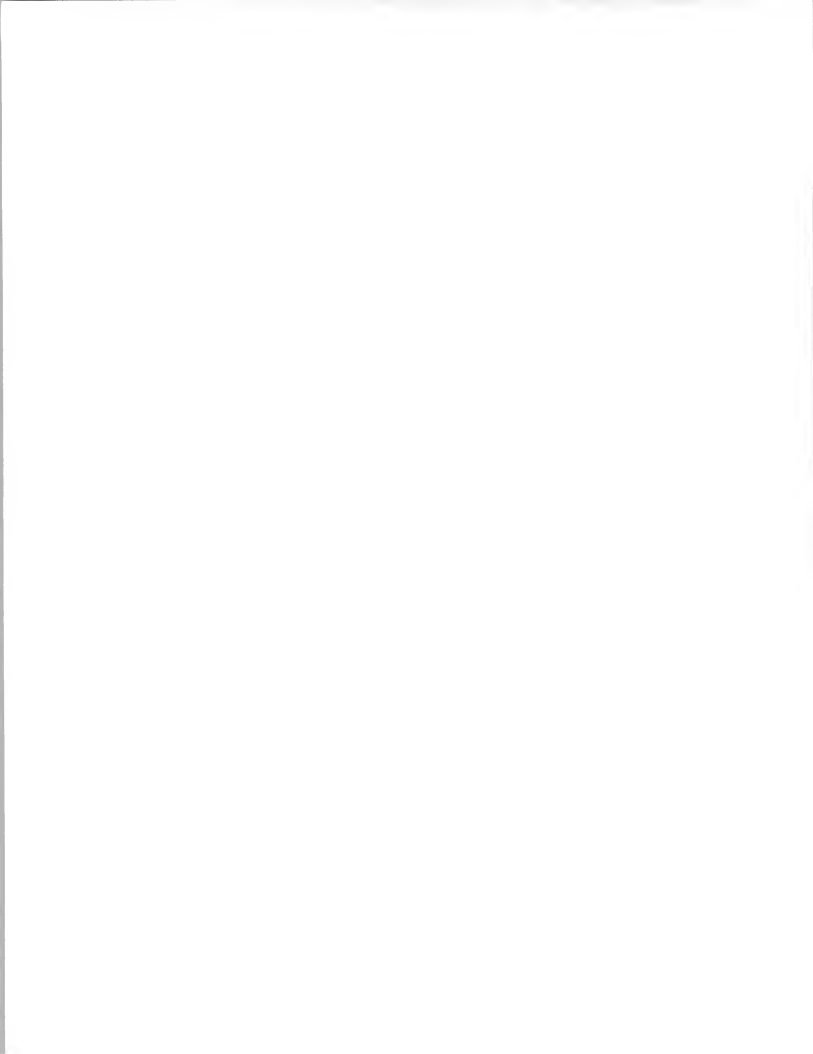
II EXECUTIVE SUMMARY AND RECOMMENDATIONS

A. OVERALL

- In each of the industry sectors analyzed and also in others, there is a basic need for new systems architecture particularly as it supports interface with the customer. Thus, this architecture is primarily network rather than processing oriented. The architecture requires a data base approach to allow information collected to be used flexibly and most effectively.
 - Recommendation: EDS should pick the major application area impacted by, and benefitting from, the integrated data base/network architecture to be developed and sell to that, rather than selling "new system/network architecture" as a general concept. Application areas would include:
 - Retail industry; integration of POS and payment systems.
 - Wholesale industry; EDI.
 - Airlines/hotels; reservation systems.
 - Utility industry; customer information systems.
- In all four industry sectors examined, marketing is very close to the number one application need. Thus, marketing information systems are a key entry point.
 - Recommendation: EDS should sell marketing information systems to executive levels to generate new revenues and improve customer service. These systems would particularly leverage customer data bases established through the network architecture.



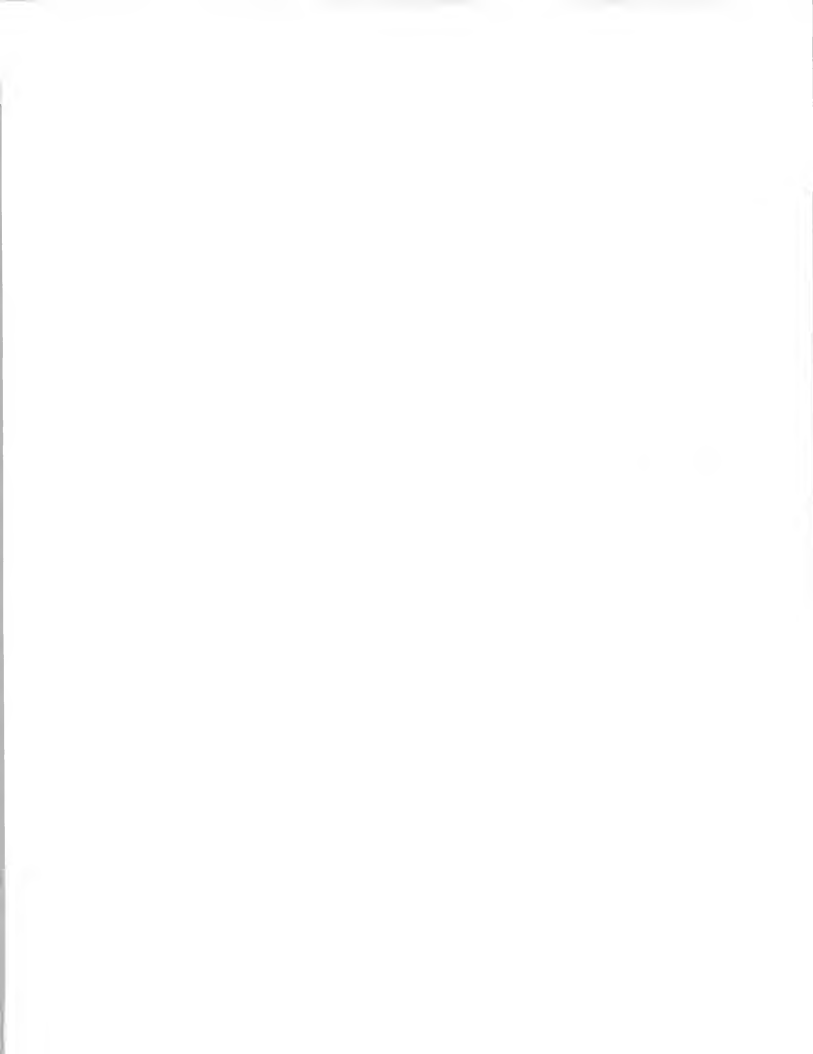
- Money handling is vital to all organizations and there are special opportunities in this group of industries. EDS has some unique opportunities through its GM developed systems.
 - Recommendation: Across industries, EDS can link EDI and EFTS using the GM-supplier EDI system, which is also a payment system. This should focus on the retail/wholesale linkage and back into manufacturing companies.
 - Essentially, GM provides an alternative to the Federal Reserve and ACH activities. EDS should focus on low-cost and security aspects of the service. EDS could open up accounts in the "GM bank" for these that don't go through an ACH, although ACH linkages would still be supported.
 - EDS should focus on the money-related activities in these industries.
- INPUT estimates there are 400-500 organizations with sufficient size to be primary targets:
 - 50 airline/hotel chains.
 - 50 utilities.
 - 300 retail/wholesale organizations.
 - These are companies that can spend \$1 million per year on an application and have IS budgets of at least \$10 million.
 - Recommendation: To prioritize approaches to these companies, EDS should select those that have undergone or are going through restructuring. Approaches through the financial organizations are suggested (not the brokers, but the actual investors such as Coniston, Edelman, etc.). The approach to the investors would be purely financial; reduced costs of development and operation. In highly leveraged situations this has significant monetary value to investors and executives. Airlines



and retail organizations are primary prospects here.

- Selecting among the industry sectors is probably not as important as selecting individual organizations. However, the utility industry is probably the least likely candidate because it has not yet been thrown into turmoil by outside factors such as deregulation (airlines) or industry restructuring (retail).
 - Recommendation: Target the airlines/hotels with a small group of focussed salespeople. Their concerns are immediate and addressable (see below). Target another small group in the utilities, primarily focussed on a few applications. Most of the resources should be targetted in the retail/wholesale sectors. Rather than segmenting by retail or wholesale, it is probably more effective to focus on the type of product, e.g., food, consumer products, auto parts, etc.

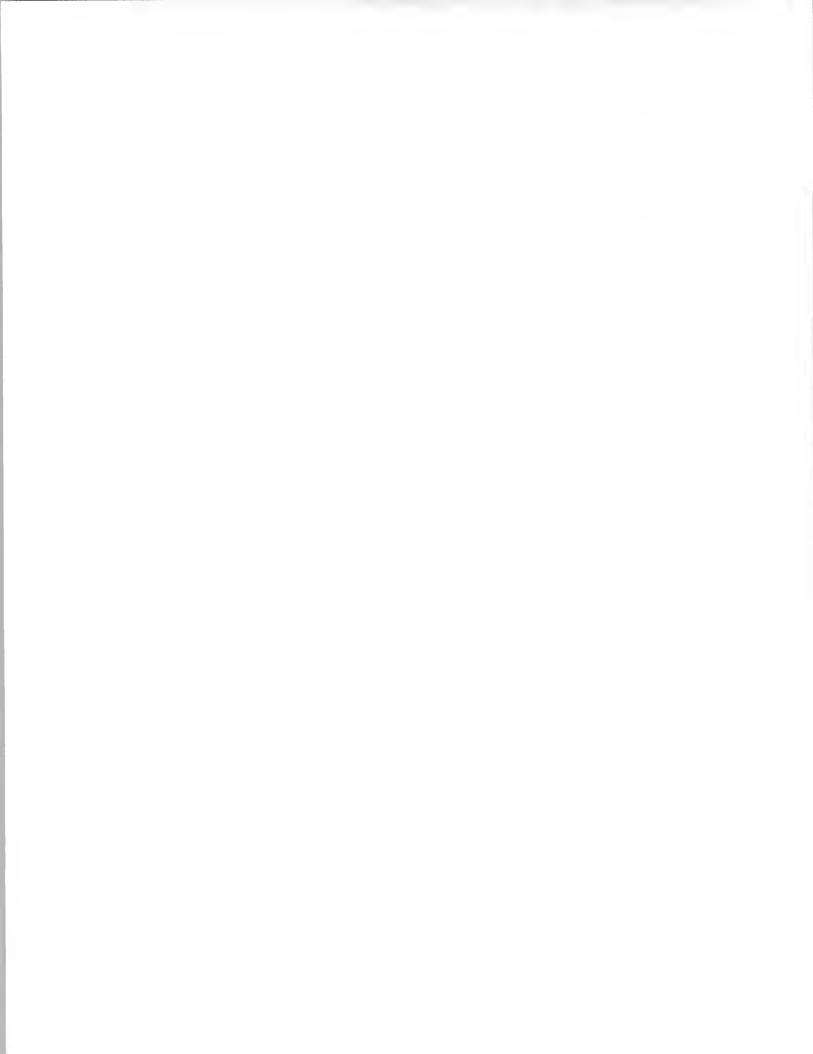
- Concern about information systems has reached a high executive level in airlines and some retailers/wholesalers. Thus, a top level approach is possible in these companies.
 - Recommendation: Target the senior executives with a financially-oriented approach. Assisting them with a planning project would be an effective entry vehicle. A key point is to demonstrate EDS ability to help at any level right through to complete operations responsibility.



B. UTILITIES INDUSTRY SECTOR

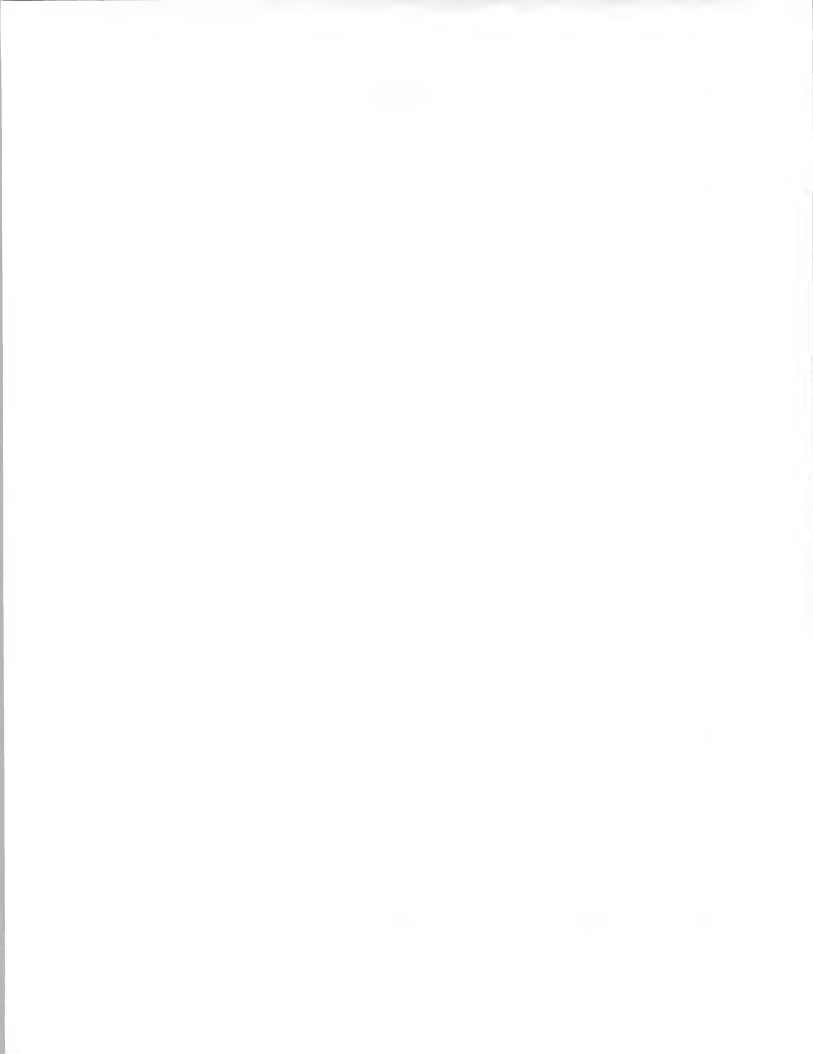
- This is the least volatile of the four sectors examined. Information systems are not viewed as being as critical as in other sectors. Organizations are highly centralized and regulated. However, cracks are beginning to appear as competition and deregulation become more prevalent.
 - Recommendation: Focus on major application development areas such as customer-oriented systems, marketing systems (new for utilities), and operational systems such as mapping (extension of CAD). Regulatory support systems are more specialized but possibilities, particularly as outgrowths of new customer-oriented systems.

- Some utilities are moving into new areas such as banking and insurance. These are obvious cross-selling opportunities.
 - Recommendation: Introduce to utility executives EDS capability of moving them into new businesses. This is primarily for investor-owned utilities. Internal IS will not have this capability.



C. TRANSPORTATION/LODGING INDUSTRY SECTOR

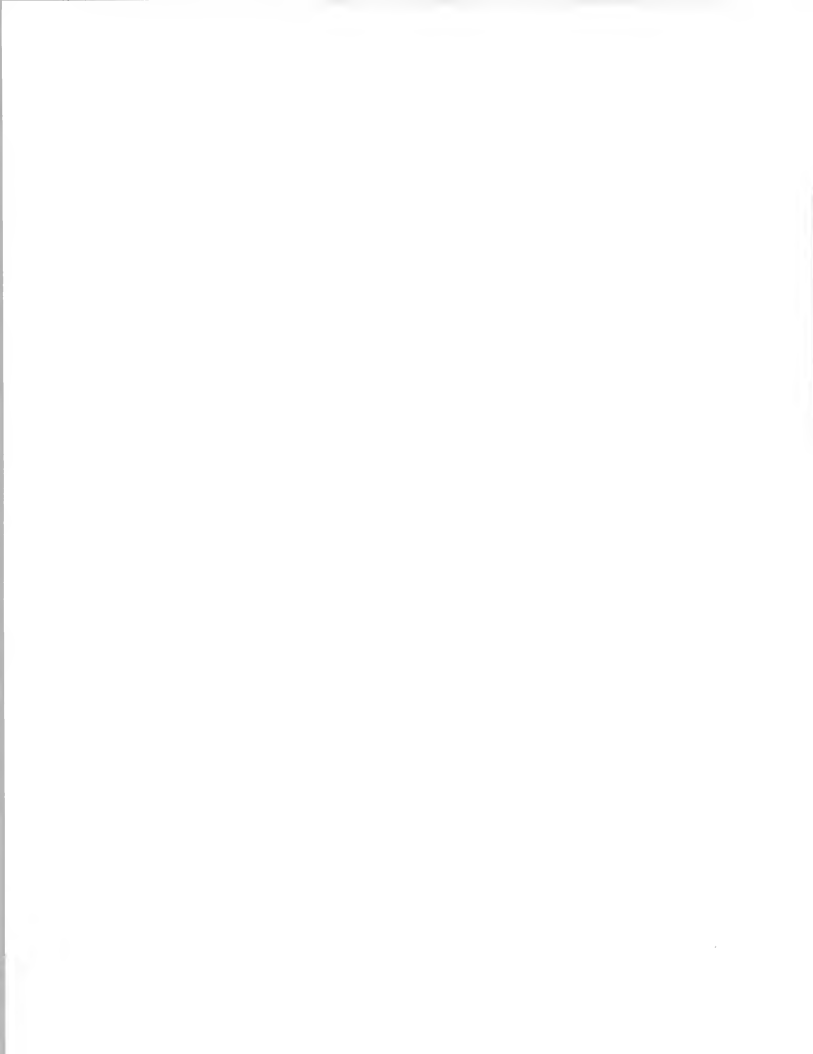
- Reservation systems are an obvious but risky area of approach. The need for new systems is rising (existing ones are up to 20 years old). The fundamental network structure needs addressing. However, these systems are highly profitable and perceived as offering substantial competitive advantage/disadvantage. Various consortia are emerging primarily in the international environment. Airlines, hotels/motels, auto rental, and other leisure outlets need these systems.
 - This is a large expenditure application -- revenues on the order of \$2 billion per year and development expenditures of \$2 billion or more over the next 5 years.
 - This application plays to EDS's strengths in networks, transaction volumes, and, recently, introduction of new technology. It is, however, very politically charged, high cost, and high risk -- it is also potentially a very high reward.
 - Recommendation: EDS must go for this. Financial approaches should be tried, e.g., setting up for a profit subsidiary with public ownership operated by EDS. This is a small target and should be approached by a few, high level people.
- The area of maintenance operations is like a giant rework and repair function. As such, EDS's CAD/CAM activities are relevant.
 - Recommendation: EDS should approach the maintenance operations applications area. It is generally separable and has commonality with its other activities. Because safety is paramount, EDS must demonstrate the management and control systems that are necessary.
- Expert systems have a role to play in many airline applications. Solutions to difficult resource scheduling problems lie in their use.



- Recommendation: EDS should sell its expert systems knowledge as an overlay to its approach to airlines. It should be an area of emphasis but not sold as a stand-alone capability.

- Frequent Flyer/Frequent Guest programs have great potential for expansion in marketing services. Here hotels/motels lag the airlines. Frequent user programs can be tied to cardless/checkless payments through the use of PIN numbers and suitable security methods.
 - Recommendation: EDS should sell its capability of developing and operating complete marketing services applications around the concept of the frequent user. This ties in with the concept of a proprietary payment system. Make the frequent user card a financial instrument. This is attractive to airlines/hotels because it increases revenues/profits. Indeed, EDS could pay the owner a proportion of revenues collected as a royalty and operate the business itself.

- Hotels and motels largely work on a franchise basis. As such, much of the local activity is under local control, within established standards. Opportunities for EDS are in the central organization and are largely network related.
 - Recommendation: Focus on hotels/motels with marketing information systems and reservation systems. They will pay to improve occupancy.



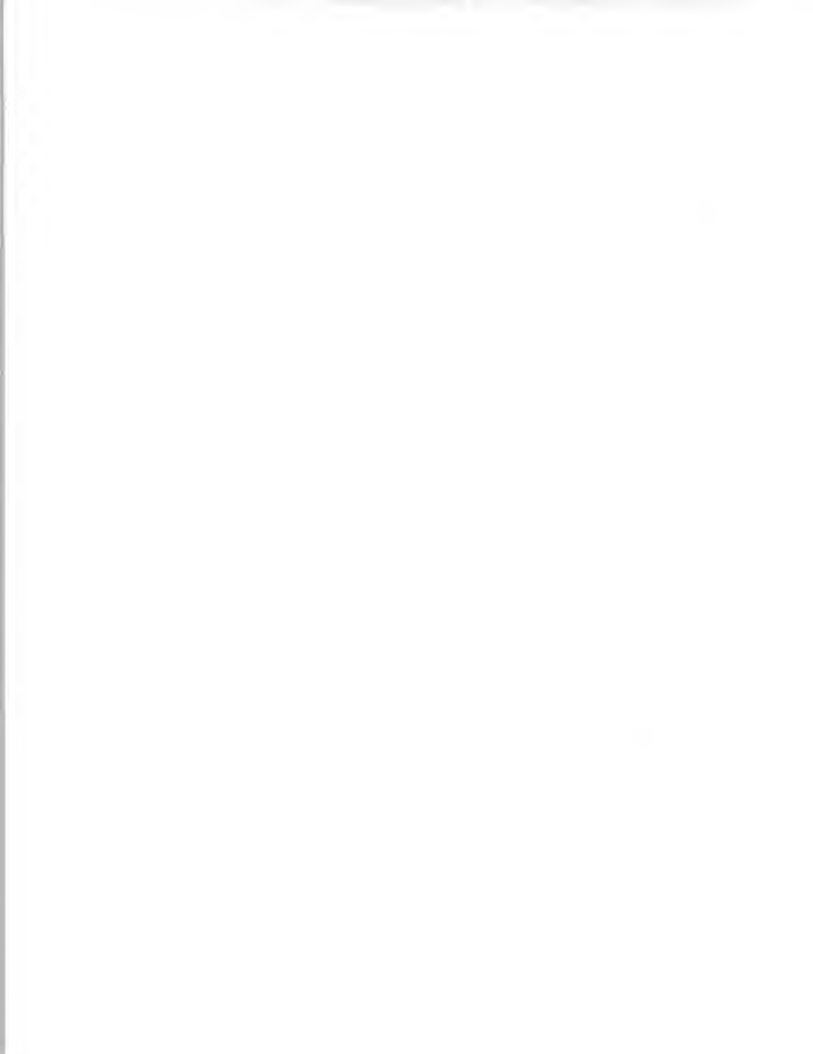
D. RETAIL INDUSTRY SECTOR

- The retail industry is "coming from behind" in much of its IS use. However, it is fraught with issues and opportunities particularly related to POS, credit cards, ATMs, and other customer interface areas. These companies are the first to see the impact of changing business climate and operate on thin margins.
 - Recommendation: Retailers are recognizing that IS can make a difference. EDS should target companies that undergo restructuring. Emphasis should be placed on the "front-end" systems at the point-of-sale.

- Merchandising and responding to customer needs is an area of competitive advantage. These systems increasingly require integration of external and internal data.
 - Recommendation: EDS should target merchandising systems enabling rapid response to customer needs, reduction in unused inventory, and effective pricing.

- Marketing systems including the use of outside data are becoming increasingly important. Inclusion of rating and advertizing data combined with massive volumes of POS data has expanded the availability of market data by several orders of magnitude. Retailers can hone-in on smaller and smaller demographic units. They can then combine such knowledge with very focussed telemarketing and direct mail campaigns.
 - Recommendation: Development and operation of macro and micro promotional and sales campaigns is an area of opportunity for EDS. Development of systems is one aspect but EDS could also operate such services on a royalty basis for a customer or set of customers.

- Electronic payment systems are a high potential application in retail.



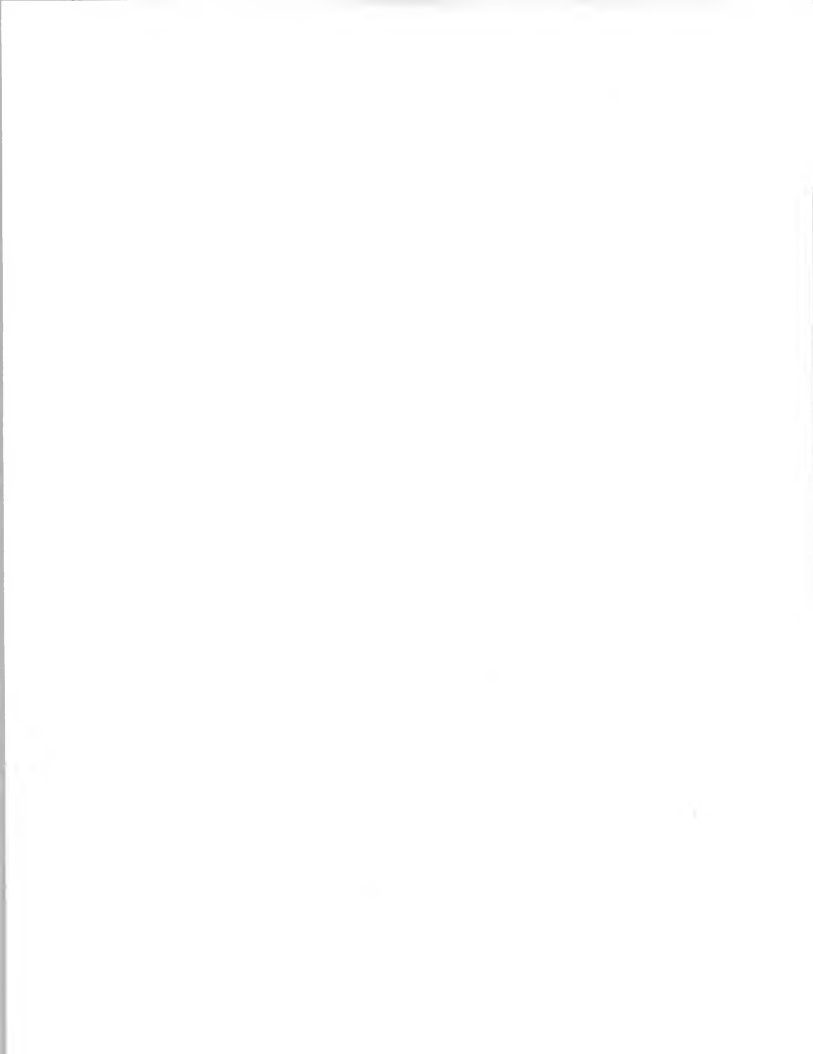
Currently only about 12% of the 125 billion transactions per year are handled electronically. Retailers want to keep customers funds as long as possible before they let the banks or credit card companies in. Thus, there is an opportunity to develop, support, and/or operate proprietary or "private label" electronic payment systems. VONS supermarket, for example, operates a paperless check system. Retailers can also be credit/debit card issuers.

- Recommendation: EDS should target the electronic payments system. If appropriate, it could provide access to its own "GM bank" on a private label basis. It should demonstrate that using its service on a private label basis is less expensive than credit cards and bank systems. Then it should leverage the data base. Alternatively, it could share the profits with the retailer.

- EDI is also extremely important to retailers. It enables them to shorten lead times and, in some cases, eliminate the need for the wholesaler in between the manufacturer and the retailer. It is extremely important in reducing paperwork and, hence, costs of operation.
 - Recommendation: EDS should emphasize its EDI capability and the ability for customers to reduce costs. This does require organization changes to take full advantage of such systems. EDS should show how these can be accomplished. The market is difficult and small at the moment. Rather than a stand-alone application, EDS should sell this as part of an overall approach to retailers.

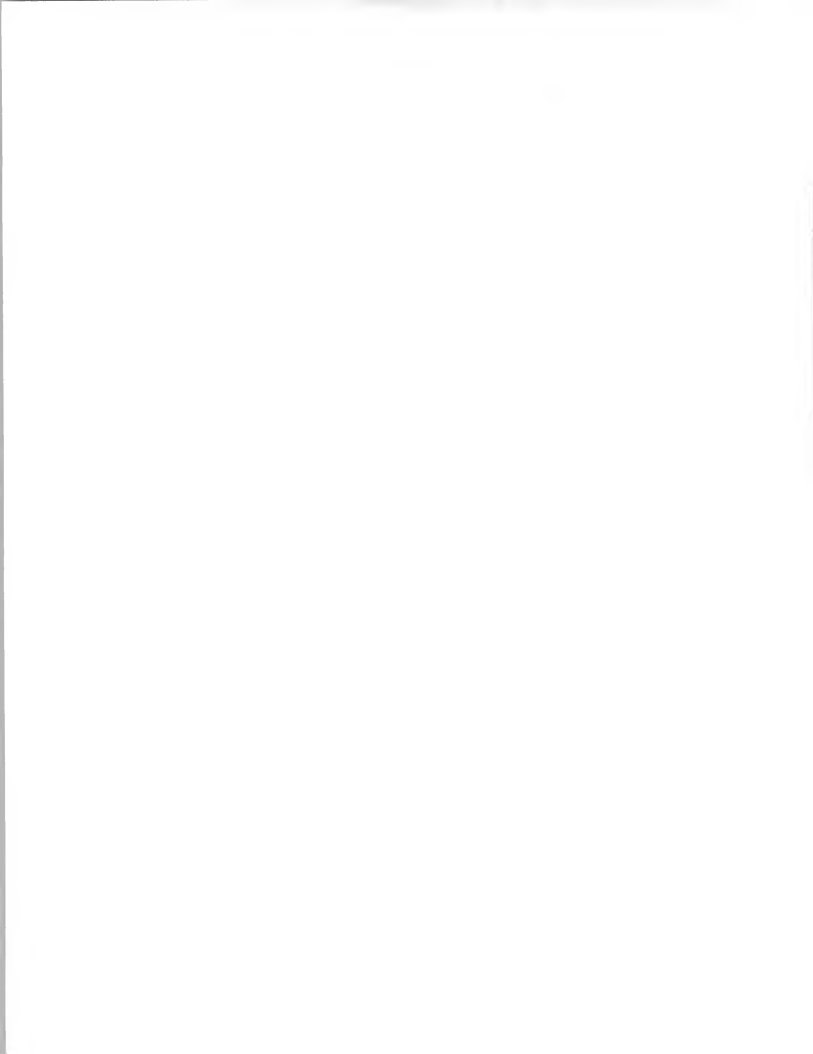
 - EDS should also emphasize the bridge from POS to EDI.

- Franchisers control a third of our GNP today and that is expected to exceed 50% by 1990. Most of them are in the retail/wholesale area. Their needs are highly network oriented.
 - Recommendation: EDS should particularly target franchise operations.



E. WHOLESALE DISTRIBUTION INDUSTRY SECTOR

- Companies in this industry sector are being "squeezed": retail mass merchandisers are absorbing the distribution function, and direct connection between retailers and manufacturers is reducing the need for the "middle-man". This will lead to increasing consolidation.
 - Recommendation: EDS should address the two major reasons for new systems in wholesalers:
 - The impact of consolidation should cause EDS to search for companies which are acquiring others. Often, existing systems will not be able to handle the growth. Indeed EDS can approach companies that are growing in this way and become their partner.
 - The emphasis on cost control, reduction of inventories, etc., will drive companies to EDI. EDS should position itself strongly in this area, particularly on a retail/wholesale integration basis. Cost control drives EDI on the "incoming" side.
- Balancing customer service and inventory levels is an increasingly complex task for wholesalers. Storage costs can be up to 40% of inventory value.
 - Recommendation: Sell EDS inventory management capabilities. This will tie-in to the EDI activity. In combination they make a powerful cost-cutting tool.
- Many wholesalers are being asked to provide, or are trying to provide, demand planning services and other services for their retail customers.
 - Recommendation: EDS should partner with major wholesalers to provide network-based services to retail customers. This includes EDI and potentially POS and ATM services. Wholesalers are possible players



in this environment for their numerous, small retail outlets. EDI on the "outgoing" side in wholesale distribution is driven by customer service and marketing needs.

- Network services, transaction handling, and cost control are critical to distributors.

- Recommendation: EDS should attack the market for network management aggressively in this industry sector. The partnership approach mentioned above is particularly relevant. Providing services to retailers through wholesalers is feasible: it is analagous to providing correspondent banking services through a bank customer. It may be a channel to attack the small retailer market.



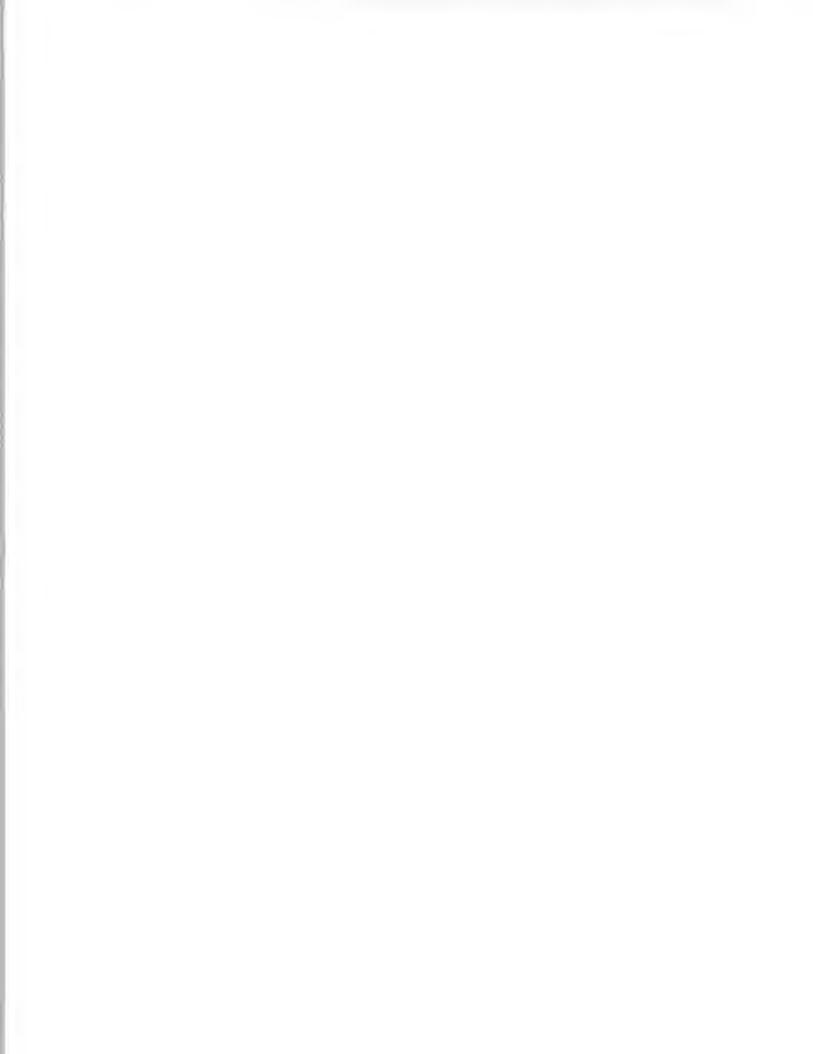
F. COMMUNICATIONS SERVICES

- Many of the applications needs in the industry sectors analyzed are network based, particularly EFT networks, EDI, and reservation systems. There are some other network services that should be addressed in these and other industries.

- Network Management (including Network Planning).
 - U.S. organizations will spend \$120 billion on telecommunications in 1987. Network management and intelligent network services are potentially multi-billion dollar markets. Organizations are generally more willing to have an outside organization manage their voice/data needs than their computer systems. This is therefore a general target for EDS. It can lead companies to effective use of ISDN.

- Telemarketing.
 - Only 4% of telemarketing applications are fully automated and 42% are partially automated. There is a growth rate in telemarketing workstations of close to 50%. Proper telemarketing needs on-line data base, call lists, electronic mail, and other features. This is an opportunity for EDS, particularly related to cross-industry marketing applications.

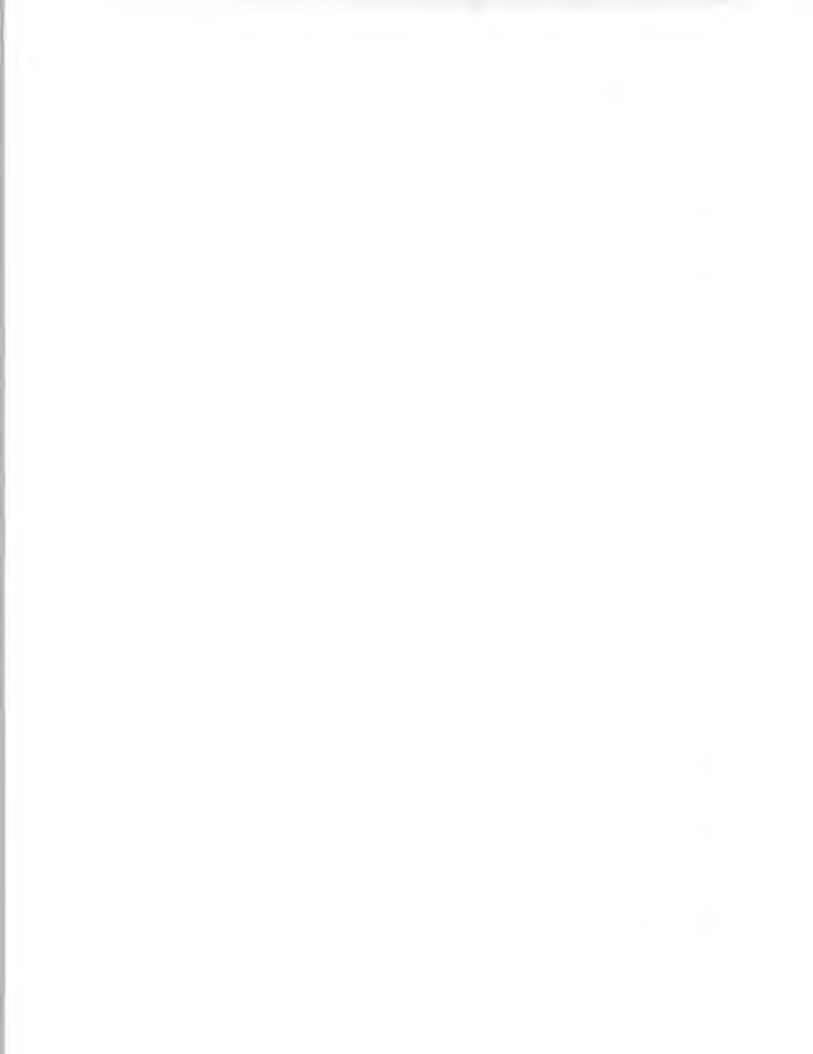
- Video Conferencing.
 - This is beginning to take off. It is being used in business communications, sometimes only in a half-duplex mode. It will be a growth area in the 1990s. It is another service EDS can provide, particularly within its travel industry focus.



III UTILITIES INDUSTRY SECTOR

A. INDUSTRY ENVIRONMENT AND DEMOGRAPHICS

- Revenues of electric and gas utilities were over \$200 billion in 1986 (gas, \$66 billion; electric power, \$140 billion). Water, sewage, and waste disposal companies account for over 90% of the number of utilities, but are relatively small in revenues.
- Electric and gas utilities are highly centralized organizations. Communications network requirements are intense, but local or regional only.
- Expenses of these utilities are primarily for energy purchases such as fuel, oil, gas, coal, etc. Costs of wages, materials (other than fuel), and services are about \$11 billion for gas utilities and \$31 billion for electric power companies. In summary, utilities spend over \$40 billion per year to operate their businesses.
- The attached charts show the distribution of utilities and their employment characteristics.
- Investor-owned and the larger municipally-owned utilities form the prime targets for EDS. There are probably about 50 entities to be targeted by EDS.
- The key issues relative to the future of utilities are the extent of deregulation and the actions of regulators.
- In the event of increased deregulation, there will be a move to free-market pricing which will push prices down. Also acting to push prices down is the current excess capacity and weak demand.
- With these trends there is more emphasis on cost cutting as well as an emphasis on the low cost of generation.



**NUMBER OF UTILITIES IN U.S. BY TYPE
1986**

TYPE	NUMBER OF UTILITIES
ELECTRIC*	
● Investor Owned	218
● Cooperatives	1,055
● Municipalities/Publicly-Owned	1,900
● Federal-Owned	9
● State Projects/Power Districts	91
Total - Electric Utilities	3,273
GAS**	
● Transmission	150
● Distribution (Utilities)	450
● Municipal Companies	750
Total - Gas Utilities	1,350
WATER†	
● Public/Municipalities	18,000
● Private Ownership	6,000
Total - Water Utilities	24,000
SEWAGE AND WASTE DISPOSAL††	
● Sewage Services	5,000
● Combined Services	340
Grand Total	33,963

* Source: Edison Electric Institute

† Source: National Association of Water Companies

** Source: American Gas Association

†† Source: Sales and Marketing Management Magazine

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations.

In the second section, the author provides a detailed breakdown of the company's revenue for the quarter. It includes a comparison between actual performance and the budgeted figures, highlighting areas where the company exceeded expectations and where it fell short.

The third section focuses on the company's financial health and liquidity. It analyzes the current cash flow and identifies potential risks that could impact the company's ability to meet its obligations. Recommendations are provided to mitigate these risks and improve overall financial stability.

Finally, the document concludes with a summary of the key findings and a forward-looking statement. It expresses confidence in the company's ability to continue its growth trajectory while maintaining a strong financial foundation.

**NUMBER OF EMPLOYEES
BY TYPE OF UTILITY, 1986**

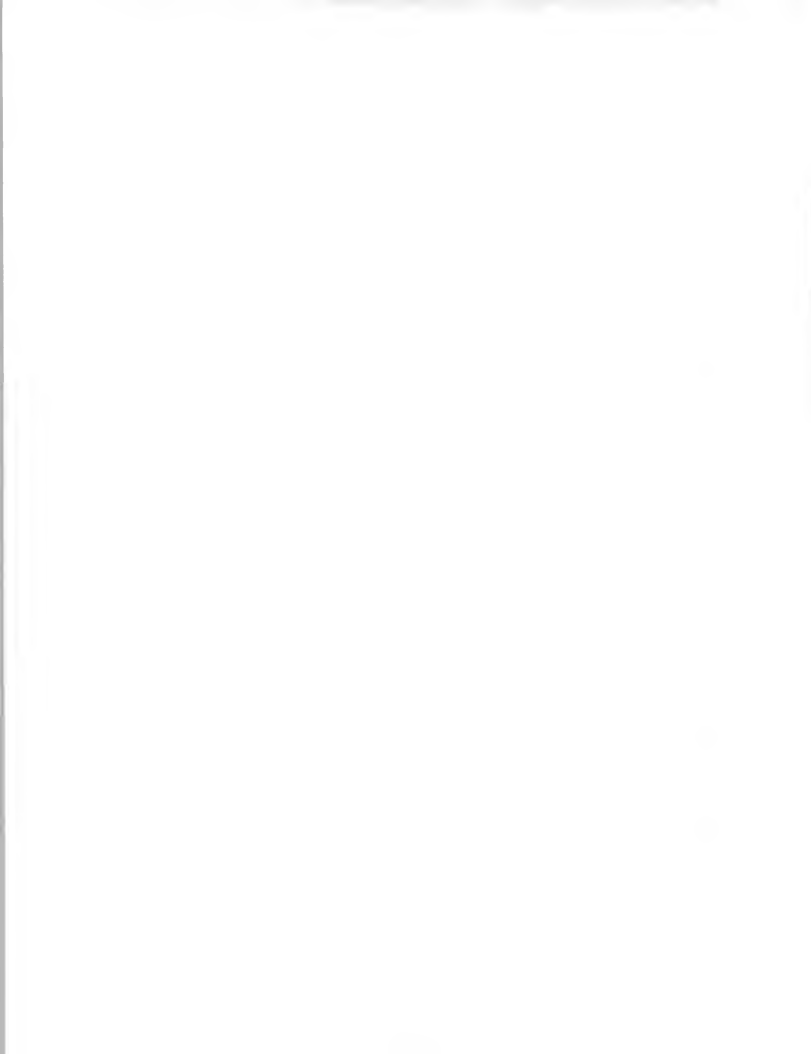
UTILITY	TOTAL EMPLOYEES
Electric	686,000
Gas (Production and Distribution)	230,000
Combination Utility Services	110,000
Water	105,000
Sanitary Services	55,000
Total	1,186,000

- Cash flow for utilities is, however, quite good. Major construction projects are winding down which will free cash. This will be used for diversification into such areas as banking and insurance.
- In the future there are likely to be imbalances of supply and demand by geographic area. This will lead to the need for improved transmission management and the establishment of transmission grids.
- There is also potential for change in regulatory measurement, from return on assets to cash flow measures.
- Utilities have relatively "austere" IS budgets. They spend 0.5% to 1.0% of revenues on IS. However, they also spend substantially for "process" control systems such as SCADA and distribution management.
- Growth rates in IS expenditures are low compared to other industries. Network needs are not as extensive. Processing and development tend to be very centralized.

B. APPLICATIONS NEEDS

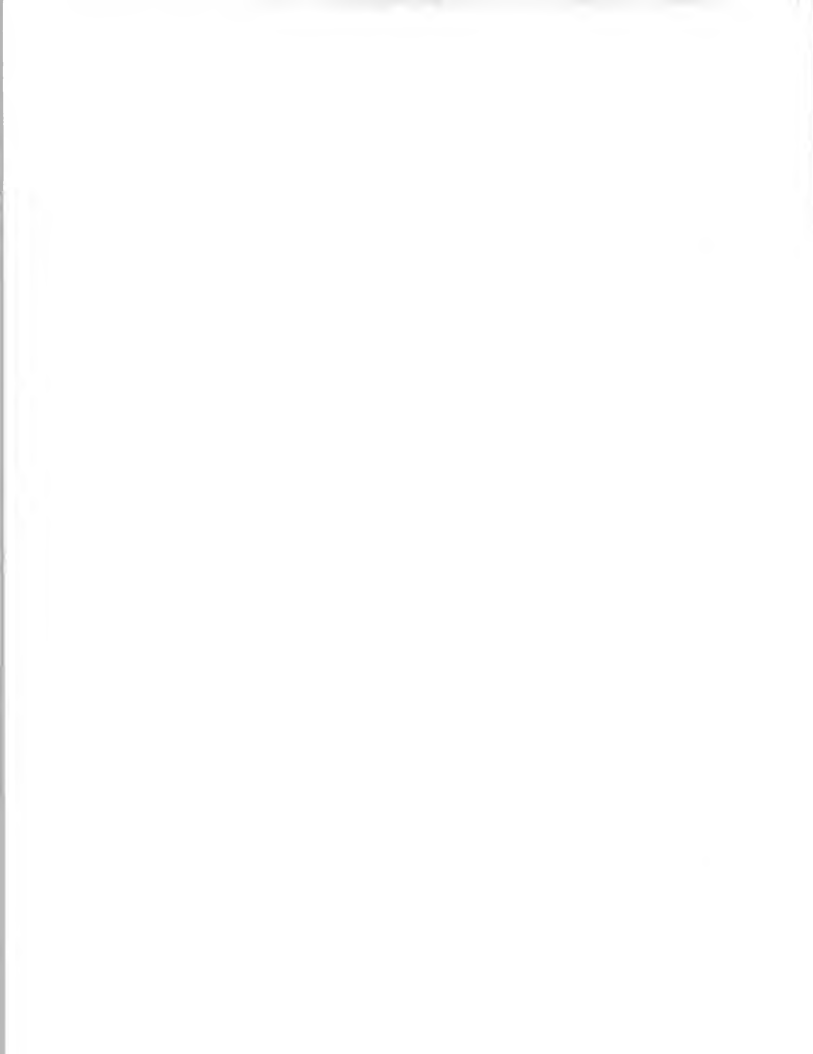
I. Administrative Applications.

- Because of the high proportion of costs in fuel, fuel management systems are very important to utilities. Price management and contracting are potential expert systems opportunities.
- The major focus of the utilities sector for applications development has shifted from accounting-oriented applications to customer-oriented and asset management systems.
- Probably the major opportunity in utilities for systems development is in utility billing systems. In 1986 it was estimated that the ten largest



companies each needed new billing systems at a probable cost of over \$10 million each. They also determined that there was little commonality among the systems so sharing the development process was not feasible. INPUT considers that a lot of sharing is possible, but just not wanted by the individual companies.

- One reason for this increasing antipathy to sharing is the increased potential for competition among them.
- In the utility billing environment, new systems are needed to deal with new approaches, for example, automated meter reading and automatic bill payment. In addition, flexible pricing systems, particularly in electric power are making their appearance. Price data can be transmitted to clients on a continuing basis and they then have the opportunity to schedule their use of power. This requires integration with telephone lines at the moment.
- However, power companies are looking at extending the information carrying capability of their power/gas distribution network. This would allow both information and power to be carried into the customer's home or business.
- Many of these innovations are only in the test stage at the moment. Utilities do not have a compelling reason to implement them as long as they are "protected" by public utility commissions. However, they recognize that innovation will eventually come and that their billing system must be flexible enough to accommodate these changes.
- Continuing with the emphasis on customer-oriented systems, customer service and customer/marketing information systems have very high priority. Again, this is fostered by an increased sense of competitiveness. There are needs for immediate access to customer information, for example on-line access to the status of work orders.
- In general, utility administrative systems have been batch oriented. While the basic processing will probably remain in this mode, the user interface must be driven to the on-line mode.



- The customer information system needs derive not only from the requirement for customer service but also for planning, marketing, and regulatory support. Rate support systems are critical to utilities. They are opportunities for expert systems approaches. As well as regulatory rate submission support, these systems have to deal with regulatory response.
- Asset management systems needs include scheduling of vehicles and people, including route management, which again have potential for expert systems. Indeed, some of these scheduling needs are potential supercomputer/mini-supercomputer applications.
- Other administrative systems needs include property management, cost allocation (important for rate support), and inventory management.

2. Operations Applications.

- One of the most critical operations applications and one which affects many of the administrative applications, is that of mapping. There is a need for internal plant mapping, but the prime requirement is external. It should provide a common "data" base integrating graphics, tabular, and textual information. Potentially it can include visual data, such as photographs or video. This is an extension of CAD technology.
- In municipal utilities the mapping function can be integrated with other department needs such as highways and traffic.
- There is a possible integration role that can be played by a third party in towns and cities in establishing such a mapping data base.
- Other general operation needs include: process monitoring and control (a highly specialized function); construction and contract management (not as important now, as construction has reduced); and equipment fault analysis.
- There are numerous other applications needs which are specific to electric

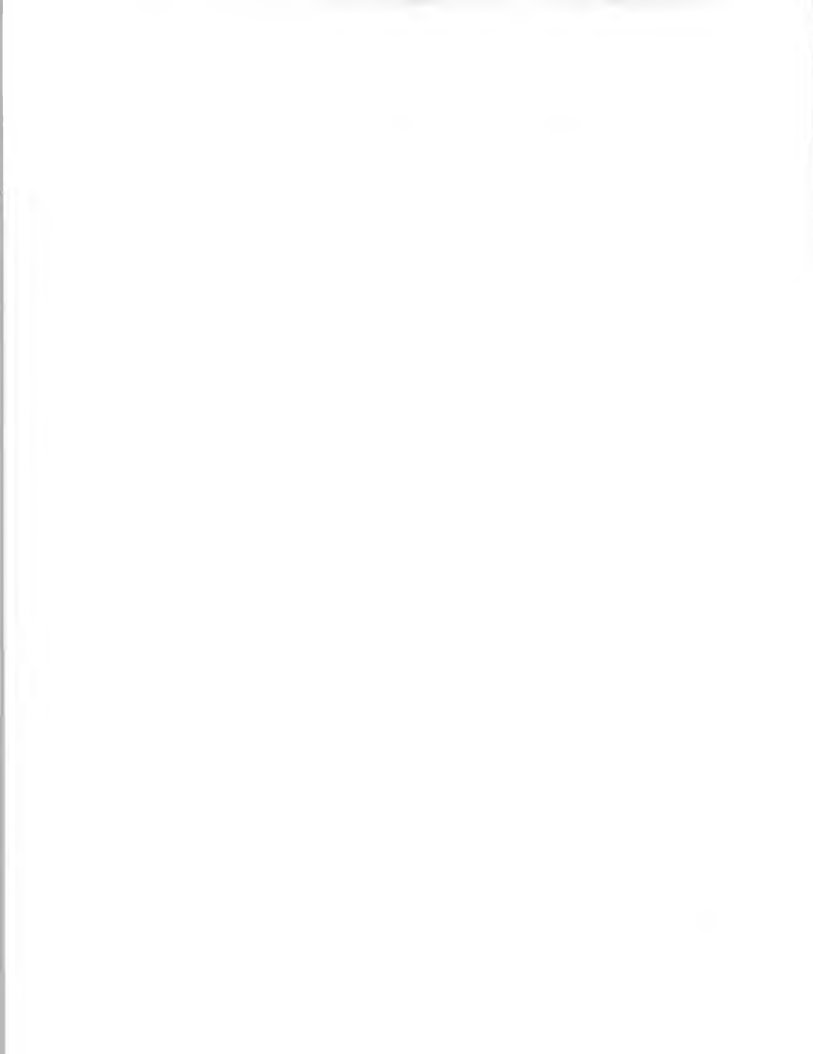


power and gas utilities. They require specialized knowledge, much of it engineering oriented, such as power/gas network configuration and engineering, systems state measurement and analysis, scheduling for thermal unit and turbine operations, generating capacity planning, and pressure/flow simulators.

- Overall, however, there is a need for systems integration. Most of these systems have been developed to meet functional, specialized needs without regard to interfaces. Utilities need basic systems architectural changes in order to match generation, distribution, marketing, and administrative applications.

C. APPROACHES FOR EDS

- Initial approaches to utilities should be based on:
 - Addressing the customer/marketing-oriented applications.
 - In the technical environment, developing the mapping systems using new technology.
 - Designing the systems architecture necessary to integrate utility functional systems.
- In customer/marketing-oriented applications, billing is key. This collects the basic data for use in other systems. By itself this is a worthwhile target. Most companies have been working on this area, however, in the past two years. These are large transaction systems.
- Mapping uses the extension of CAD systems which should be an EDS strength. By addressing this system, EDS can "back" into scheduling, fault diagnostic, and other dependent systems.
- The basic architecture issue focuses around the move to integration of applications and the move to on-line data bases to support a variety of



functions.

- In targetting specific utilities, EDS should categorize them by their cost of production characteristic. Low cost producers will have substantially different interests from high cost producers; low cost producers will have more discretionary funds. They are likely also to be interested in diversification.
- It is also useful to examine their construction project status. Those utilities with projects just finishing will have very positive cash flow and be more willing to consider new approaches and IS investments.
- In marketing to this industry, there are powerful associations, the Edison Electric Institute and American Gas Association. There are also affiliate organizations such as the Electric Power Research Institute which can be a source of operations data.
- State regulations and conditions are extremely important, for example the provision of life-line services in states such as California.
- One opportunity area for EDS is to examine the inter-utility applications needs such as grid planning systems and inter-utility power/gas pricing and transfer. A third party role may be valuable.



IV TRANSPORTATION/LODGING INDUSTRY SECTOR

A. INDUSTRY ENVIRONMENT AND DEMOGRAPHICS

- In this sector we address only the airlines and hotels, the people-related part of the business.
- Total travel services industry revenues in 1986 were about \$270 billion, primarily to small businesses and many related to personal automobile driving. Two major segments of this industry with a substantial number of large companies are:
 - Airlines, 1986 revenues \$52 billion.
 - Hotels/motels, 1986 revenues \$44 billion.
- In airlines there are 12 companies with revenues over \$1 billion and 16 "national" carriers with revenues in the \$75 million to \$1 billion range. These companies are highly computerized although many of the systems, developed in the days before deregulation, are now obsolete. With cost pressures in the past few years, airlines have not spent adequately to maintain their basic architecture.
- Deregulation and industry restructuring are dramatically affecting airlines. There has been more stability in the last 6 months, but another shock, such as a recession or a major fuel price increase, could cause a major "shake-out" in the large companies. This delicate situation provides opportunities and cautions for EDS: opportunities exist because airlines must protect their capital and cash to use in their basic business (for buying new airplanes, for example). On the other hand, there is the potential for large, uncollectable receivables from an airline that fails.
- In the hotel/motel industry, the chains have 69% of the room market in the

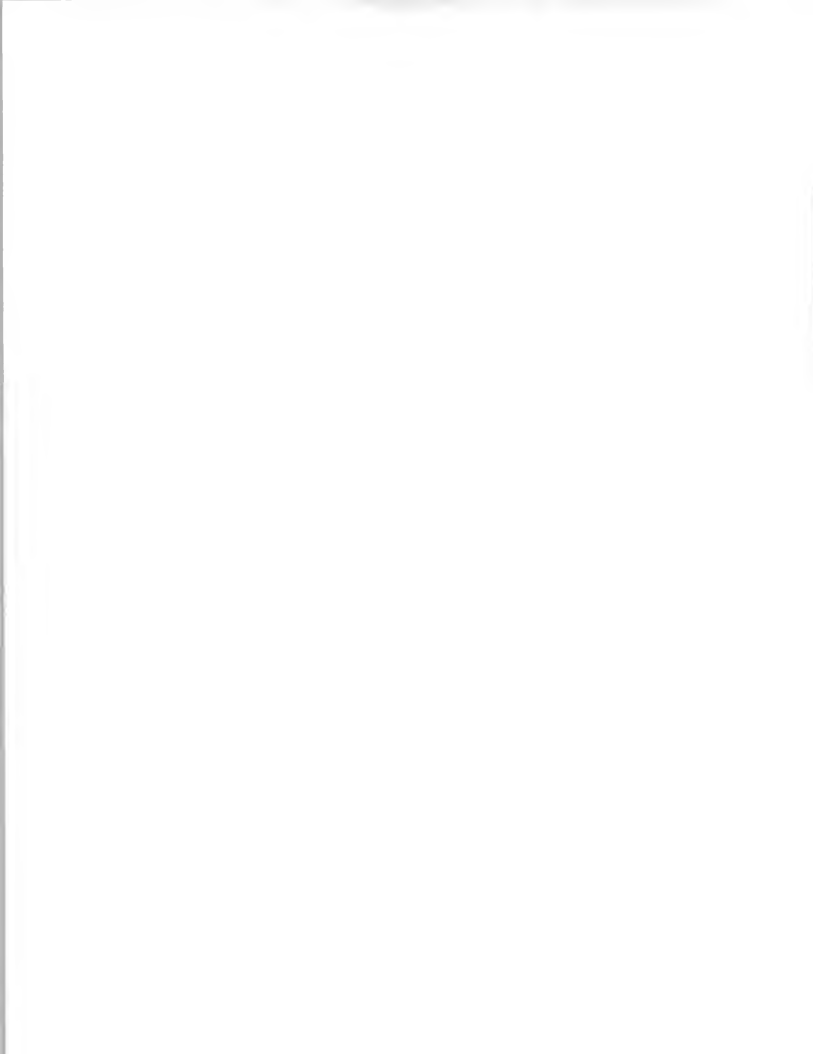


U.S. There are 45,000 properties in total in the U.S. of which 3,000 have more than 200 rooms. Total number of rooms is about 2.2 million. Most of the properties controlled by chains are, in fact, franchise operations. In this they are very similar to auto rental organizations.

- Hotel chains, airlines, restaurant chains, and auto rental organizations often have direct or indirect relationships.
- Overall travel volume will grow at up to 10% per year. This, combined with the strong needs for computer/communication systems and services, makes the travel industry an attractive target for EDS.

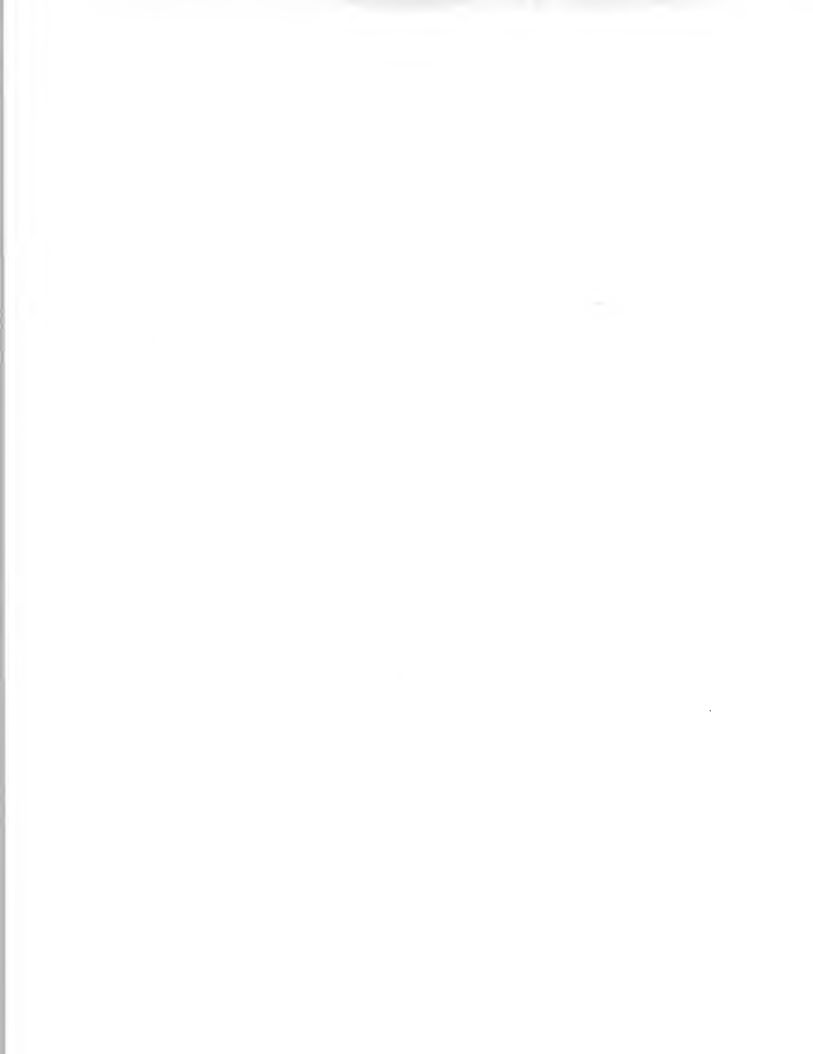
B. APPLICATION NEEDS

- I. Computer and Communications Needs.
 - The travel/leisure industry is a heavy user of telecommunications, and yet there is a great need in this area. The need can be simply described as the ability to connect anything to anything and exchange data.
 - The business requirement to conduct day-to-day operations is an important area of need. This is especially true in the airline industry.
 - Most companies in the travel/leisure industry have automated systems in the customer sales and service area. However, most of these systems are quite old and were developed prior to the availability of some of today's technology.
 - The airline industry is still struggling with the problems/opportunities that were created with deregulation. The planning and support systems that are so crucial to survival in a competitive environment are very new or missing.
 - The industry needs overall technical architectural planning.



2. Hotels/Motels.

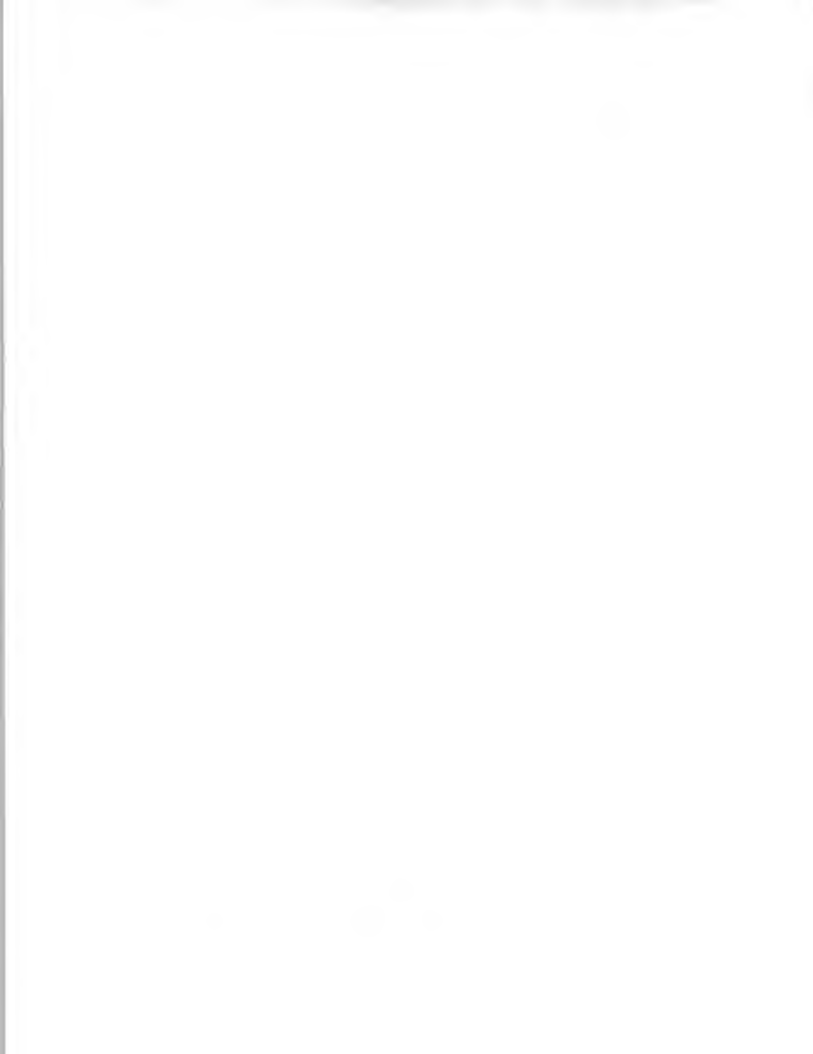
- For hotel/motel chains, and indeed any major hotel, access to a reservation system is mandatory. This is not only for handling of the inventory of rooms, but also for the scheduling of resources, cleaning reception, restaurant, etc.
- Objectives in the industry are:
 - Keep occupancy rates high (the industry average is 70%). In this context if Marriott Corporation could rent one extra room each night in each of its hotels it would mean \$1 million would be added to its profit line this year.
 - Keep costs down. Scheduling of resources and loss avoidance are critical here. Whereas "central" systems such as reservations and marketing affect revenues, cost control is primarily a "local" function with the exception of systems such as central purchasing.
 - Protect and entertain the guests. Again this objective is met primarily from local systems for security and entertainment.
- In hotels themselves, integrated systems are making considerable headway. In the past five years, individual functions have been addressed separately, whereas now hotel operators want their property management, energy, telecommunications, security, and entertainment systems integrated. There is an opportunity to provide turnkey systems to do this. Honeywell has had success in this segment of the market.
- The three application needs that EDS could address are:
 - Reservation system: as an example, Marriott Corporation has spent \$10 million on a system that may not meet all its needs. AMR is aggressively selling Marriott and other hotels that they should use its system rather than their own. There may well be a role for an independent here.



- Network and communications management services: providing voice and data equipment and lines for the chain, and then managing the network. One of the major sources of irritation for guests is the telephone systems in hotels and its costs. There are also issues such as satellite TV, cable, and video conferencing which have business and entertainment aspects. Centralized purchasing and management can be cost effective and profitable for the third party.
- Marketing system: hotels/motels collect a valuable data base on travellers. They have not leveraged this to the same extent as airlines. Although frequent visitor programs and other promotional systems are growing, additional effort is needed. Marketing systems are essential for competitive positioning and added revenue streams.
- There may also be opportunities in payment systems for EDS. Credit card processing, credit/check authorization, and payment distribution are important applications for hotel/motel chains.

3. Airlines.

- In airlines, EDS already has a position through ticket processing. The number of potential customers in the U.S. is small, less than 20, but their needs are large and fairly well defined. There are also many international airlines.
- Information and information systems in airlines are absolutely critical. Arguably, those companies with the best CRS (computerized reservations system) have profited most from deregulation. However, it is not only the reservation system which is critical. Other applications are:
 - Aircraft and crew scheduling – two separate but related systems.
 - Aircraft maintenance scheduling and management which includes many systems akin to manufacturing systems.



- Ticketing, which may include replacement of physical ticketing.
 - Yield management.
 - Marketing, including fare establishment. The dynamic allocation of fares is possible.
 - Communications network management. Although airlines already have ARINC to perform some of this for them, they have broader needs.
- Airline operations needs.
 - The principle areas of need in operations exist in the application areas associated with crews and airplanes.
 - The assignment of crews to flights, the interaction of the actual flight with safety and union rules and the management of the results is a need that has only been partially addressed even at the larger airlines.
 - Flight planning is done by all airlines, but it is an area with great potential for improvement. Cost savings are available from a mix of variables that impact crew time, fuel consumption, and schedule reliability.
 - Closely tied to flight planning is flight monitoring. This is the legal and management requirement to know where the airplanes are in relation to where they should be at all times.
 - Irregular operations is another area that has been automated by the large carriers. However, for most airlines the automated systems have not kept up with the changes required in today's environment. Small and some medium size carriers still do this function manually or are semi-automated. Simply illustrated, what does an airline do if a major airport ceases or reduces operations suddenly? Where do the planes in the air go? What do you do about the passengers and their luggage? How do you put the fleet and the crews back together so that you can



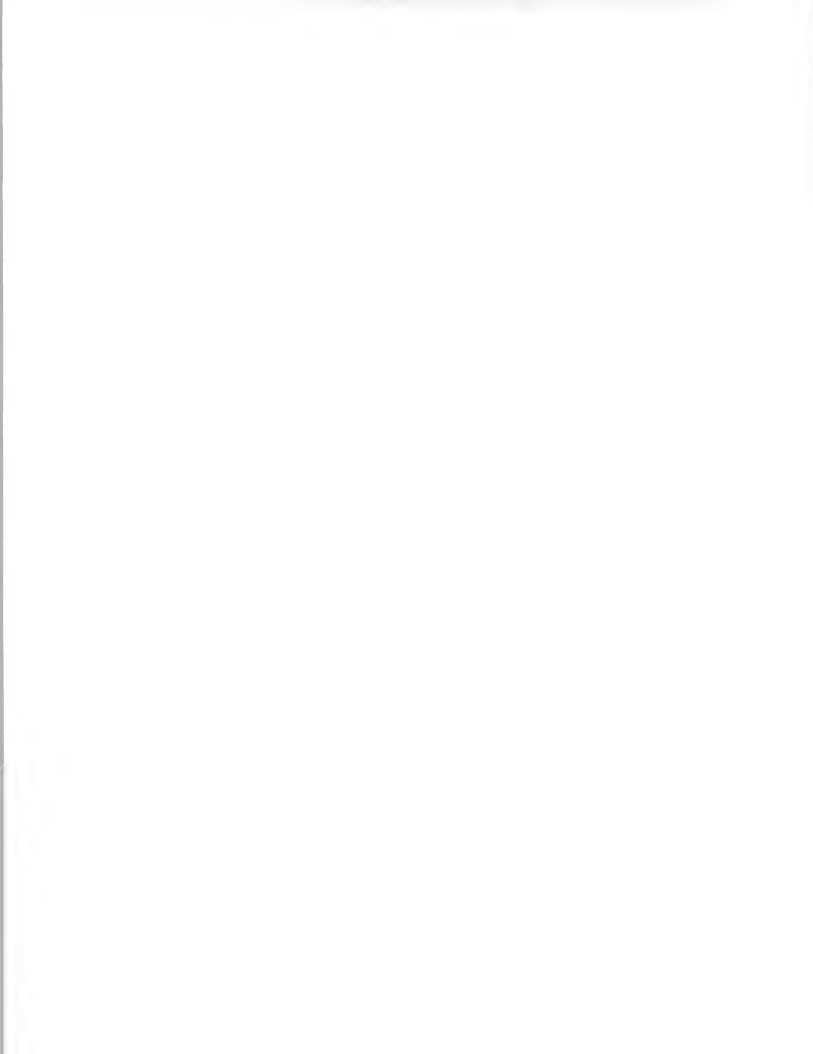
operate tomorrow?

- The hub and spoke concept of scheduling is now well known and heavily used by large carriers. This creates a need to better manage the airport and the services provided to airplanes and to passengers. Gate management at large airports can be a nightmare when an irregularity occurs. Matching the service requirements of the aircraft (which vary by aircraft type, e.g., wide versus narrow body luggage handling) with available gate space needs to be done. Informing the passengers, and those waiting for passengers, of any changes quickly and accurately needs to be done.
 - Automation can also be used to get back on the normal daily plan after the irregularity has passed.
 - There is a need to integrate the information from the various automation systems that exist today as well as those yet to be developed. Passengers are demanding better and more reliable information when delays and cancellations occur.
 - A large and important part of operations at an airline is the maintenance of the aircraft and engines. Needs exist in inventory control, diagnostics, time and material planning and control, and purchasing.
- Customer Sales and Service.
 - Almost all airlines in the world have their own computerized reservations system or access to one. The sales and service function is automated within these systems. For all practical purposes, there are only two hardware vendor-supplied systems in this field. One by IBM and one by Unisys. For airlines with volume requirements greater than approximately 200 messages per second, the only practical solution is an IBM-based system.
 - The majority of the business requirements for these systems are being met. However, the basic systems are twenty years old and lack the



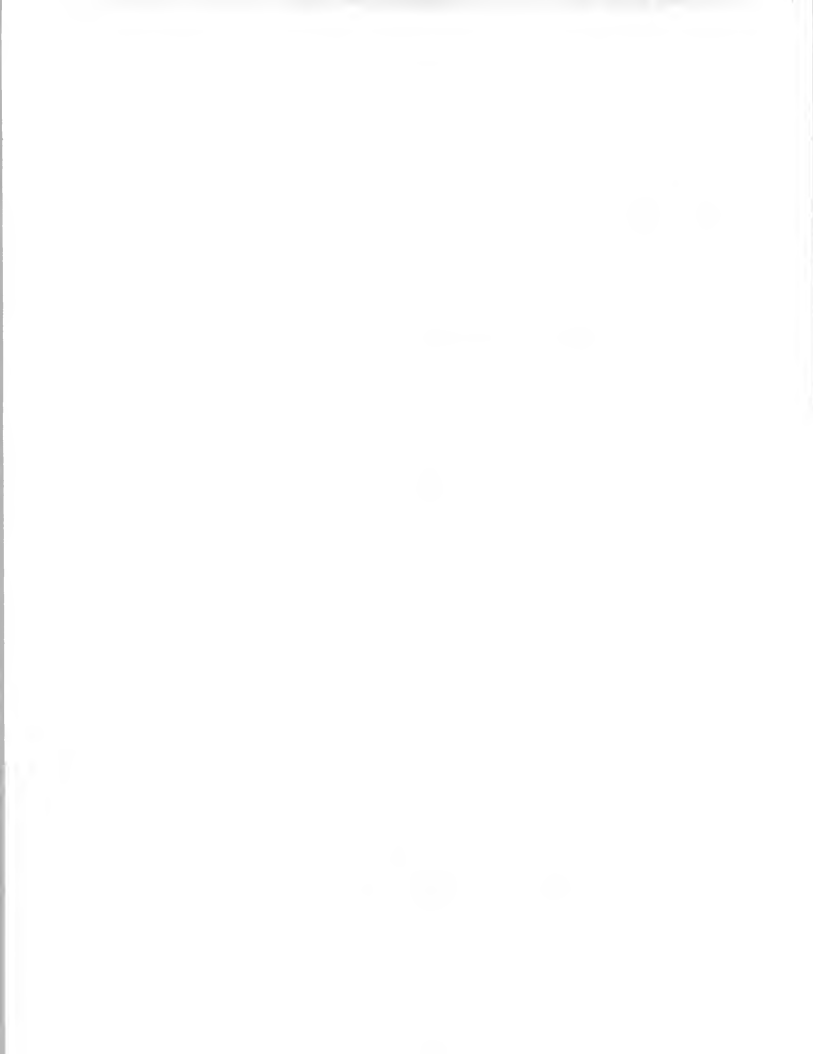
necessary technological base which makes new development and changes to existing systems easy and inexpensive. The cost of these systems and their scarcity are continuing problems for the airlines.

- In this area there are also many non-technical questions which will change the airlines needs dramatically depending on the outcome. For example, will the Congress pass legislation which limits the airlines ability to operate computerized reservations systems for travel agents? Will competitive pressures cause the airlines to market directly to Corporate clients with volume discounting and thus dramatically change the information distribution system currently in place?
- The needs in this area are to provide greater flexibility to the marketing departments of the various companies since this is their principal means of competition. The technological tools represented by data base management systems, automated design tools, code-generation and auto-documentation would be of great value if they could be applied to the applications development process associated with sales and service.
- Unless one of the non-technical events described above occurs, there will probably not be a wholesale rewrite of the applications in this area. It seems more likely that the needs will be answered through architectural planning, and intelligent networks which will allow new applications to be developed outside the existing central site computer mainframes while still providing the necessary integration to produce a product which will satisfy the needs of the passenger.
- There are several different hotel computerized reservations systems in production. the dominant one is a derivative of the airline system and has the same technical base and the same problems. Hotels do not have the same volume requirements, and there is no reason why other solutions will not work for them. A major conversion is probably too expensive as it may be in the \$5 to \$10 million range. A service bureau approach which includes an intelligent network would be a better answer to their twin needs of low expense and competition through



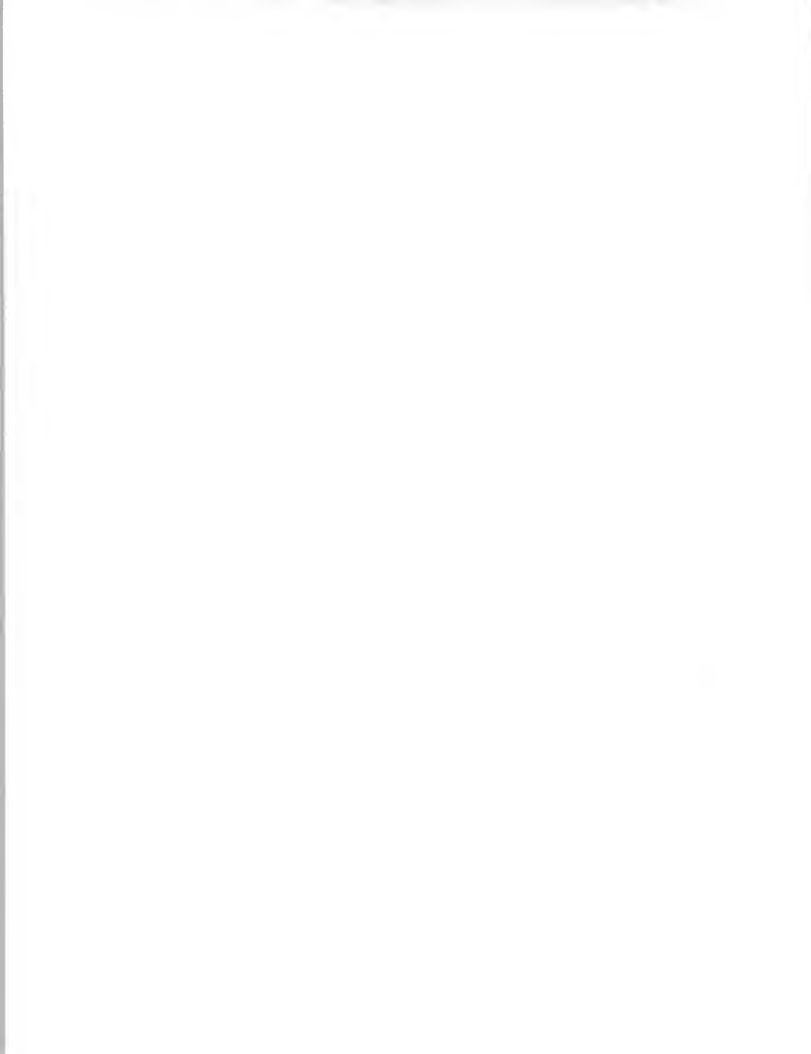
technology.

- Only Avis in the rental car business has a reservation system that is based on the airline technology.
- There are five major operator reservation systems in the U.S.: Sabre (AMR), Covia (Allegis-UAL), System One (Texas Air), PARS (TWA/Northwest), and DATAS II (Delta). As well as serving their own ticket outlets, these systems service travel agents. Over 90% of the 27,000 travel agents are connected to one or more of these systems. Sabre has the largest number with almost 10,000, while Covia has over 7,700.
- Other airlines are debating what to do: join one of the existing systems, join a consortium of other airlines, or "go it alone" with their own system.
- One key factor is the "bias" built-in to the major systems. Until recently these systems always emphasized the system owner's flights. Because of "anti-bias" actions they now are a lot more equitable in providing information. However, it is still possible that the U.S. Congress may cause divestiture of these services by the airlines.
- Planning and support.
 - An airline is a very integrated but geographically dispersed operation. During the days of regulation, cost accounting systems were geared to the requirements of management in a regulated environment. Planning systems were designed around the fact that fares and routes did not change rapidly. Everything is now different. Although deregulation has been in place for a number of years, the need for good planning and support systems has become greater.
 - The leaders in the market need to understand the cost and revenue impact of proposed changes. Leaders and followers need to be able to quickly propose and analyze competitive responses.
 - Support systems are needed to translate approved plans into action.



Many of the applications which support the various functional areas of the airline were never designed to react as quickly or in as integrated a fashion as is required in today's market place.

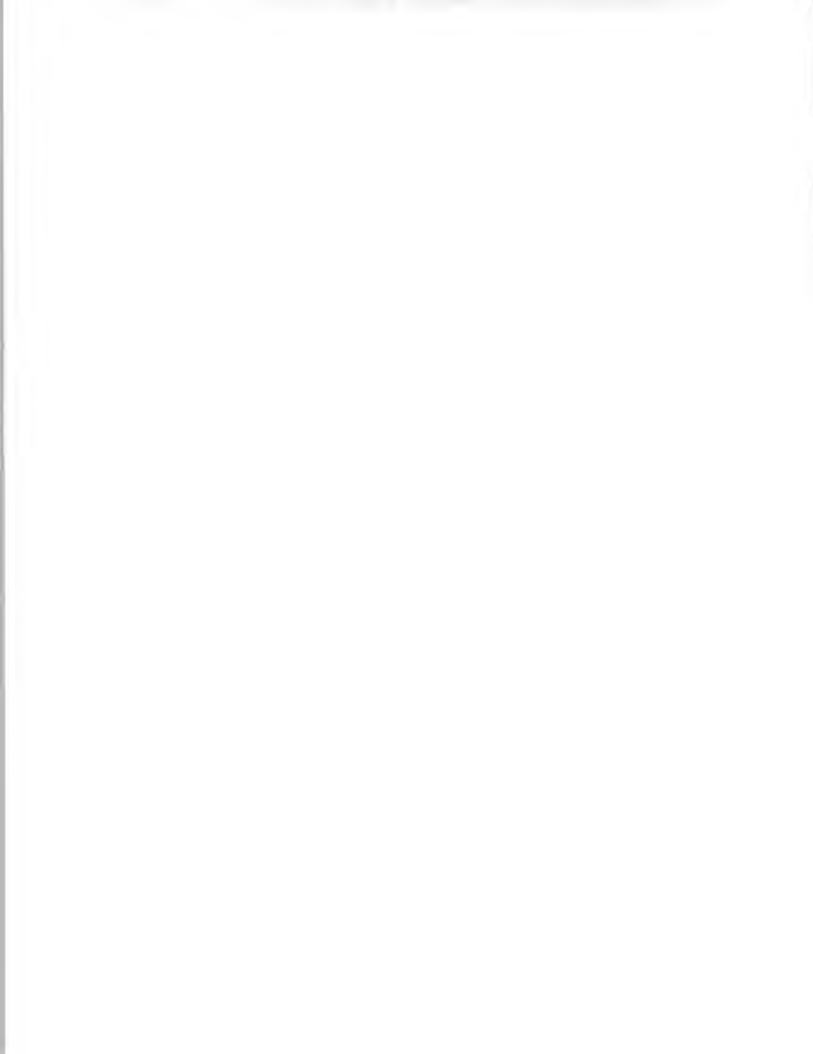
- Technical architectural planning.
 - The travel industry companies need help with the overall technical architectural planning. In the past, this function has been performed largely by hardware vendors. Take the example of the development of the IBM Program Airline Reservations System, PARS. This systems was developed from the terminal through to a modified disk file with both hardware and software by IBM.
 - It is very unlikely that this path of vendor support will meet the current needs. Today, a vast array of hardware and software exists that can be used to meet the needs of travel industry companies. System and utility software is much more available than a few years ago. The challenge is to integrate the available hardware and software with overall business requirements to produce a situation where system deployment can be quick and inexpensive. A technical architectural plan will help define the standards that will aid in connectivity, consistent use of data and applications integration. An intelligent network is the keystone that can tie the various pieces together.
- Telecommunications network needs.
 - Data telecommunications needs should be described from the perspective of an overall architectural plan. If no such plan exists, then a discussion of telecommunications network needs should serve to highlight the need for an architecture.
 - The latest technology allows for a great deal of computer power to be distributed. Great power and capability can be put at a customer service counter or a desk top. Mid-range computers that can operate in office environments are increasingly powerful.



- The existing data telecommunications networks for the travel industry were conceived and designed during the time of the "dumb" terminal and the large central site. The companies in this industry have attempted to modify their existing networks, and a very few have started projects to implement new networks.
- When a customer is at an airport, or a hotel lobby, many of their needs can be satisfied locally with data that is locally stored and maintained. Data that is required from another source that is geographically remote may be needed. The presentation of the data may need to be varied depending on the physical location and service method, e.g., attended or self service.
- The network needs to provide a pathway or connectivity to allow the customer needs to be met. The design should allow for changes to be introduced including the addition of new devices, new data, changes in data location and new applications. The network needs to contain intelligence that can interact with the computers and computer terminals that are housing the data and presenting information for the customer. The overall architecture should allow for various levels of continuing service even if one or more pathways in the network cannot be maintained.
- The overall network design should contain local area network capability as well as network-to-network interconnection for cross-industry communication. The architectural plan should describe data and applications standards which anticipate the existence of an intelligent network.

C. APPROACHES FOR EDS

- For purposes of major contracts, EDS should focus on the central units of these organizations and particularly their network needs. These companies are concerned with maximum use of their inventory (airline seats, hotel rooms,



automobiles) at many remote locations.

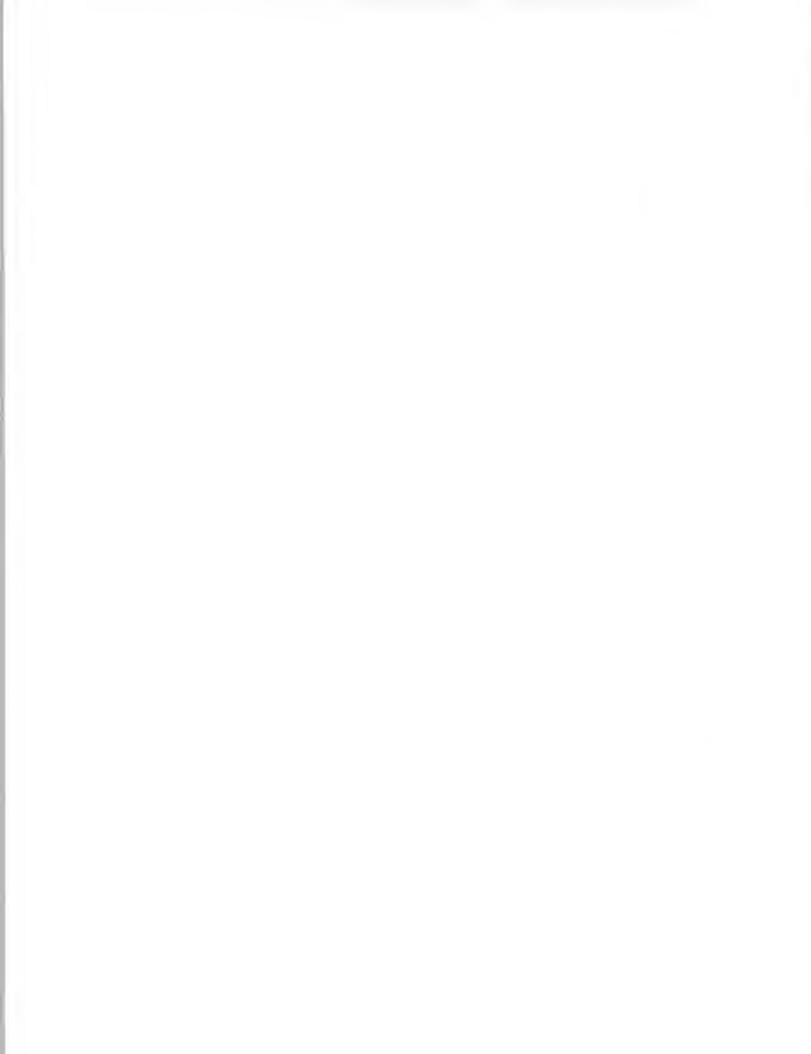
- One applications opportunity for EDS is to operate an independent reservation system or to build a new one. Another alternative would be to become the marketing/systems manager of one of the major reservation systems -- perhaps with buy-out/buy-back provisions. In the event of divestiture, this would become very possible. EDS may also be able to consolidate several of the smaller systems to make the resulting systems more competitive with the leaders, Covia and Sabre.

- As well as operating the reservation system, there may be a major opportunity in developing new reservation systems. The existing systems are architecturally fairly old with the exception of System One. The capital involved in building these systems is large: UAL has spent \$300 million on Covia and will spend another \$120 million with its new European partners, a consortium of airlines including Alitalia and British Caledonian. Another European consortium plans to spend \$300 million. In line with the above comments, caution should be exercised here -- it is a very political and "charged" issue.

- From EDS's perspective, this is a very attractive industry target. The international airlines, in particular, need the applications that U.S. airlines have, but do not want to be dependent on them. Many of the communications network requirements also are truly international. Travel and freight movement are the backbone applications of international networks in terms of volume.

- There are three areas of recommended concentration. In priority order, they are: 1) operations; 2) planning and support; and 3) technical architectural planning.
 - For EDS the area of Maintenance Operations would appear to be a natural fit. Maintenance is clearly different than manufacturing, but at the same time there are many similarities. Maintenance is like a giant rework and repair function.

 - The new technology of Expert Systems is applicable across many of the



need areas. In the maintenance of jet engines, the diagnostic function and the decisions on how far to proceed in a tear-down before repair appear to lend themselves to a rules-based solution. Expert system technology would appear to be a good candidate to help in the area of Irregular Operations Planning. Some airlines are using expert systems to help solve the gate assignment problem at the airport. Many of the problems at the airport would appear to be solvable with expert systems.

- Planning and support is dominated by fare, schedule, and crew planning. The area of greatest need is fare planning and support. This is especially true for analyzing competitive responses. Expert systems technology may also be applicable in this area. The airlines need to have their support systems provide feedback to the planning systems much faster than current systems provide.

- Technical architectural planning is the area of need, but some travel services companies may perceive the need as a telecommunications network need. The new technologies, as represented by the latest generation of personal computers, expert systems, rapid development software products, and intelligent networks, will be much more effective if they are used within the context of an architecture.



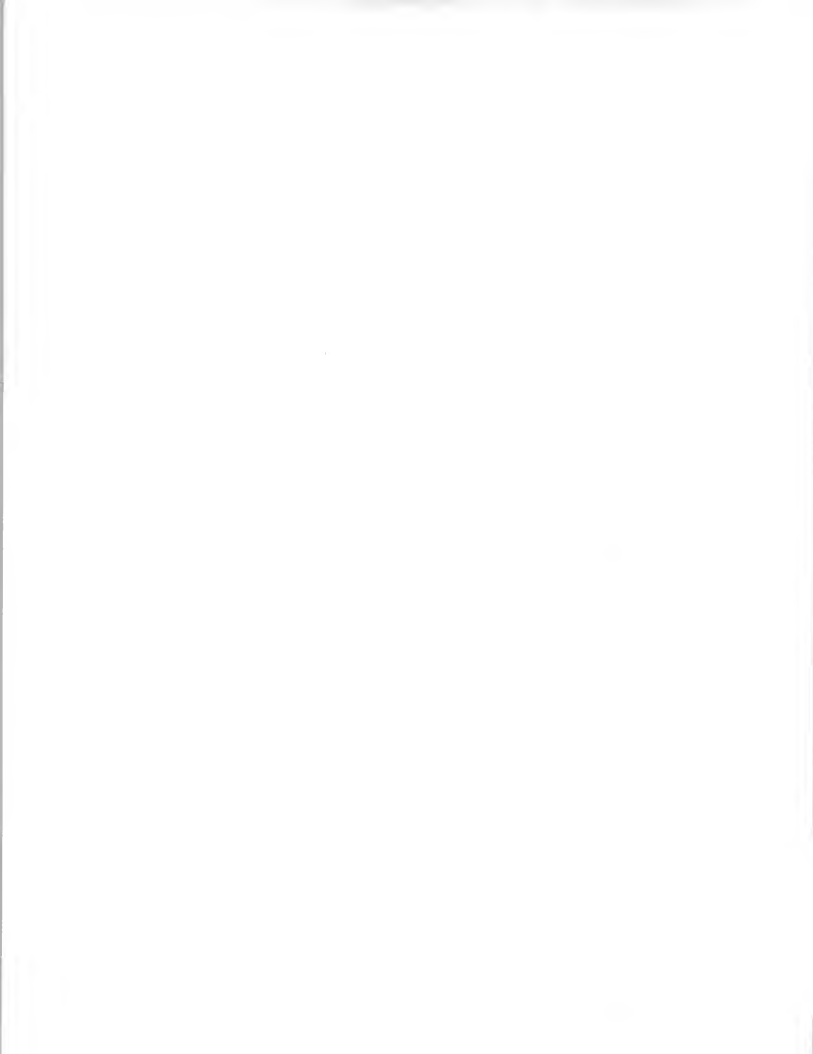
V RETAIL INDUSTRY SECTOR

A. INDUSTRY ENVIRONMENT AND DEMOGRAPHICS

- There are four major groups of retailers.
 - Mass merchandisers (discount stores).
 - General merchandisers (department stores).
 - Food stores.
 - Specialty stores including drug stores and gasoline stations.
- Industry revenues in 1987 are \$1.6 trillion.
- Overall retail industry growth is about 2.5% annually.
- Consolidation among major store chains will continue in all retail sectors leading to larger and more stable operators capable of major investments in information systems.
- Major retailers are seeking ways to offer better service to compete for customers. This includes:
 - More responsiveness to fashion trends and other consumer preferences.
 - Speeding up payments at the point-of-sale.
 - Faster and more convenient delivery of goods.



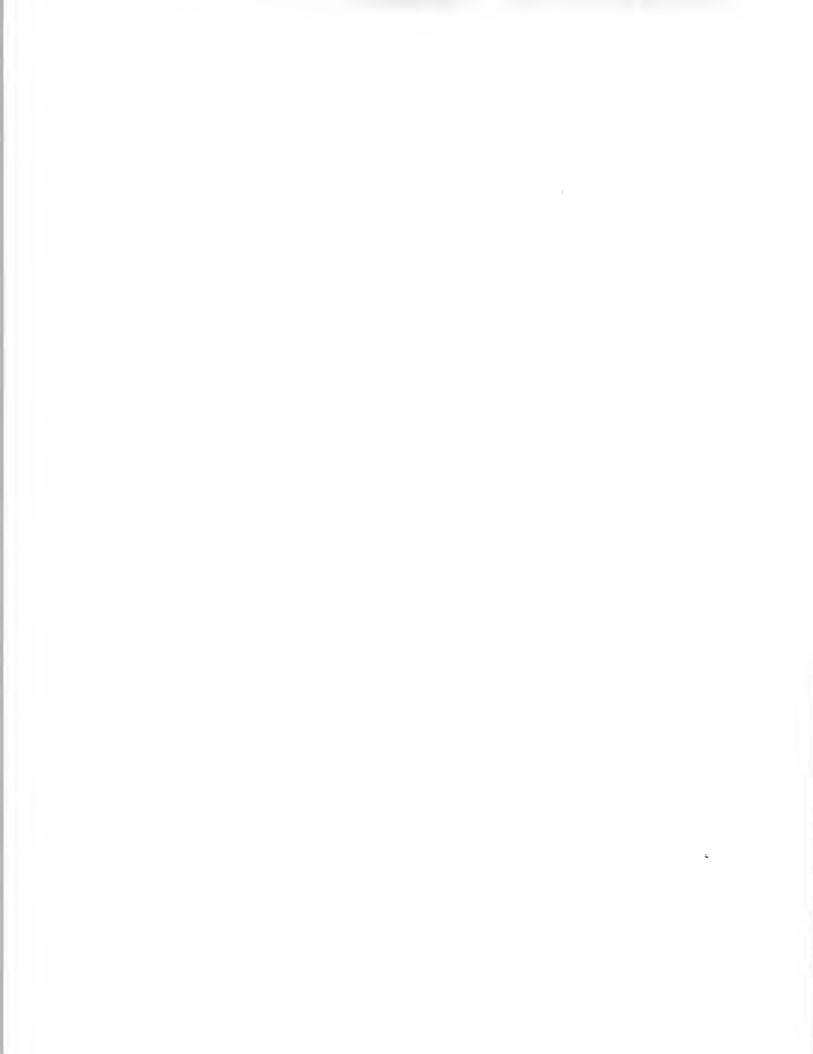
- Major retailers also are investing heavily to improve company and industry operational economics via Electronic Data Interchange (EDI) systems. This results in major benefits, including:
 - Lowering inventory requirements and carrying costs.
 - Reducing costs of distribution.
 - Optimizing store location and size.
- Retailing is becoming more specialized with stores being targeted at upscale customers and ethnic groups. This trend is heaviest among food and apparel stores.
- Retailers are using information more effectively to market as well as plan and control their operations.
 - Outside data bases such as census and credit records are being merged with operational and merchandising information to target promotions.
 - As a result, there is a growing interdependence of IS applications.
 - This all results in a technical requirement to interconnect internal and external systems.
- Retailing is in a "catch up" mode for IS due to historically low spending rates relative to other industries.
 - Except for POS, most retail IS systems are based on older technology and need to be upgraded over the next 2-3 years.
 - There is also a shortage of skilled applications personnel which further compounds the problem.
 - Distributed data base architecture will be used for new systems to provide flexibility and easier applications development.



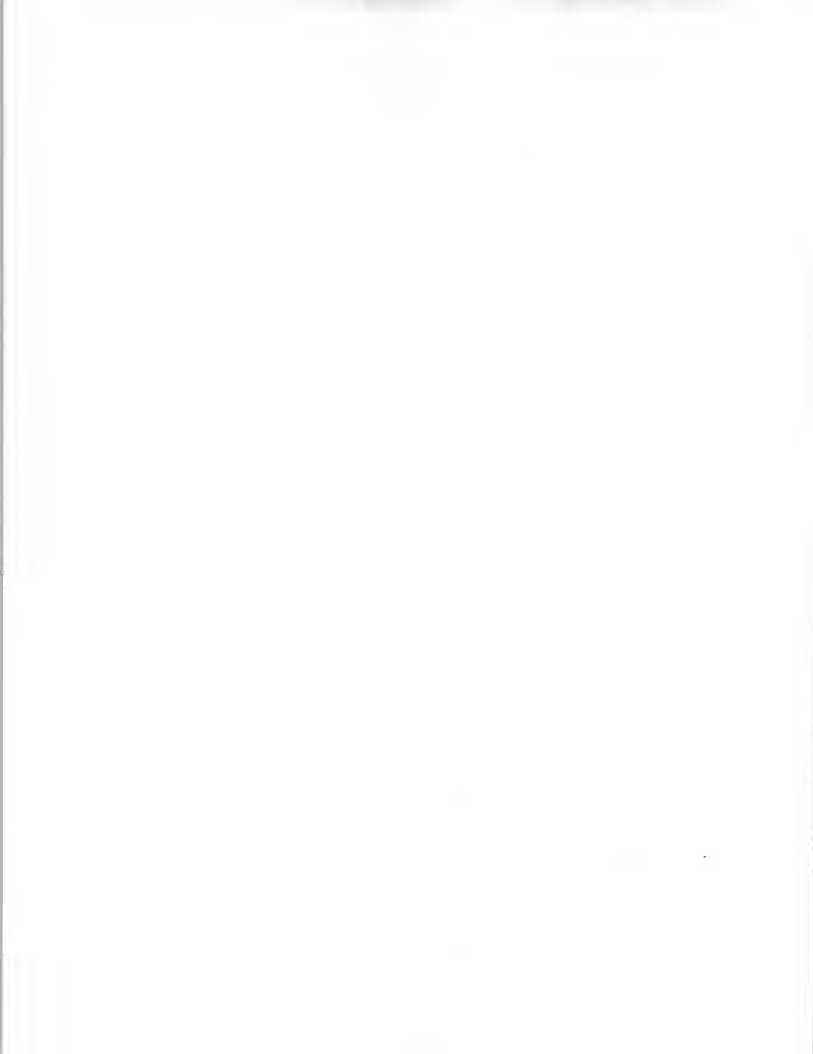
- Two other factors impact retailers' attitudes toward spending on data processing and promote conservatism.
 - Overall low profit margins (2-3%) are traditional.
 - Retailing is often the first sector of the economy to feel the effects of normal business cycles leading to a kind of boom/bust environment.
- Generally retailers spend 1-1½% of annual revenues on IS.
 - This is low among all industry sectors where the average is 2%.
 - Outside service expenditures are also below average, but are increasing due to POS services which frequently are provided by third parties.
- INPUT forecasts a steady increase in retail spending on IS over the next 3-5 years due to the potential high return on investment of new applications.

B. APPLICATION NEEDS

- I. Major application opportunities exist in all areas of retail operations.
- Point-of-Sale (POS) systems are the primary target for retailers.
 - POS systems perform both payments processing and transaction data capture.
 - Increasingly, POS systems cover all types of payments such as:
 - Credit card.
 - Check.



- . Debit card.
- . Loans.
- . Coupons.
- . Electronic checking accounts.
- . Cash management.
- Connections to transaction authorizers from the POS is a key system requirement.
- Data captured at the POS becomes input for other systems including:
 - . Inventory management.
 - . Purchasing control.
 - . EFT.
 - . Marketing and merchandising.
 - . Customer records.
- Food stores, gasoline stations, convenience stores, and mass merchandisers will continue to be the POS leaders for the next 3-4 years.
- McDonnell Douglas, National Data, Telecredit, Visa, Amex, and in-house are the established competitors in providing POS services.
- Retailers will also invest heavily in marketing and merchandising systems in the next few years.
 - The retailers' major objective is to improve their response to changing customer needs and purchasing trends.



- The key system feature is an integrated data base including inputs from:
 - . POS systems.
 - . Merchandise inventory systems.
 - . Census data/demographics.
 - . Consumer purchase patterns.
 - . Credit histories.
 - . Advertising expenditures.
 - . Market research.

- Marketing, advertising, and promotional programs can be designed and tested using the integrated data base.

- The potential is enormous, e.g., personalized mail order catalogues, narrow targeted telemarketing and home shopping programs, local stores as well as chain-wide merchandising, more effective advertising, and reduced credit/collection costs.

- Larger stores, general merchandisers, and food stores will be the leaders implementing such systems in the next 3-5 years.

- Dun & Bradstreet, ABG, and national credit bureaus are major suppliers.

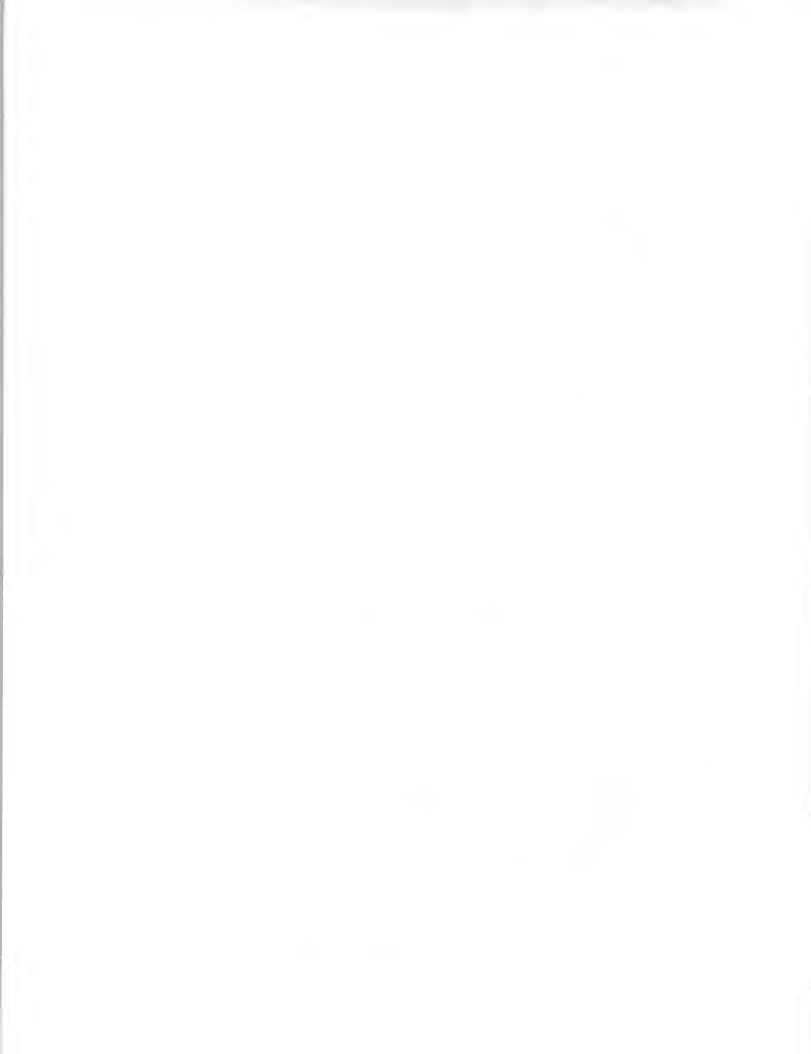
- Expanded chain-wide communication systems will be installed by major retailers.
 - Major mass and general merchandisers are expanding/upgrading national communications.



- Key needs are for POS, EDI, distribution of pricing trends, and administrative data and decentralized purchasing.
- Dedicated networks and LANS are being installed, e.g., K-Mart.
- Retailers will increasingly be open to linking into EDI programs sponsored by major trade associations, leading wholesalers, and third-party service suppliers.
 - EDI eliminates much paperwork involved in order processing.
 - Retailers' computers talk to manufacturers'/wholesalers' computers to place orders and schedule deliveries.
 - Food store mass merchandisers will be EDI leaders for the next 3-5 years.
 - EDI is now a small market but growing very rapidly. EDI services revenues will reach \$2 billion by the mid-1990s.
 - There are no firmly established competitors, but Sterling Software, GEISCO, IBM, and McDonnell Douglas are the largest.

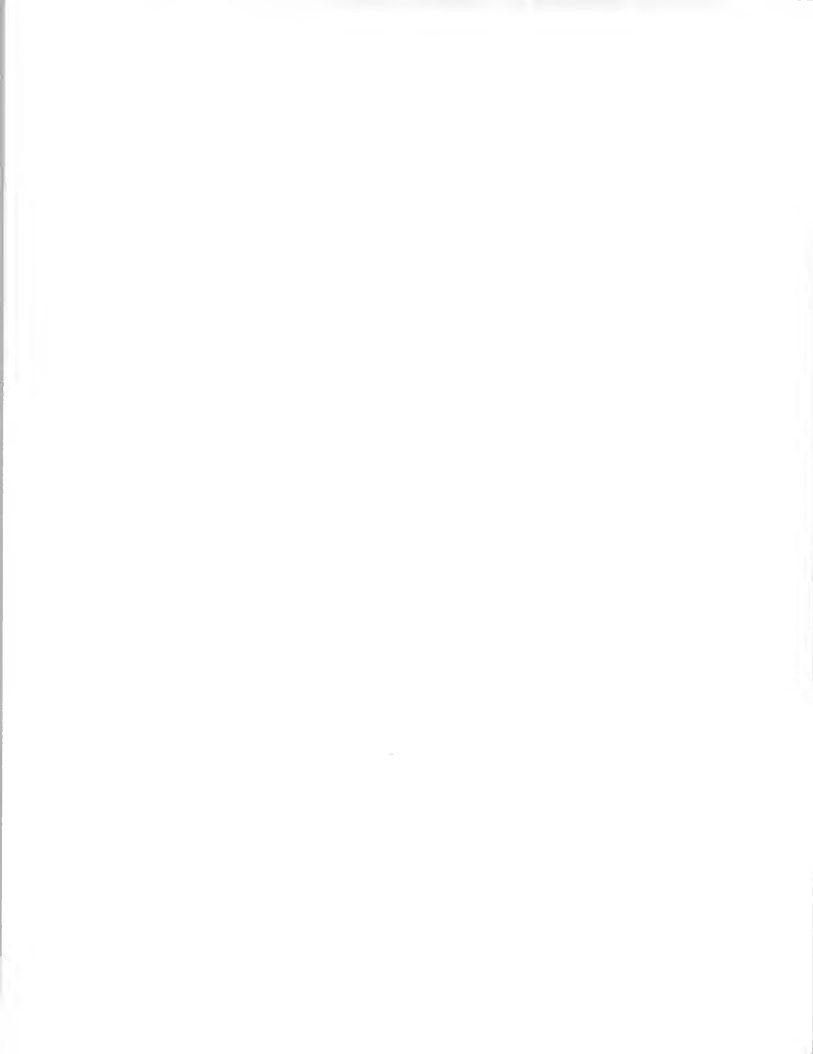
C. APPROACHES FOR EDS

- Several large, national retail chains have started to make IS investments in the new application areas. These firms represent specific targets at which EDS can direct market development activity.
 - Among food stores, Safeway is carrying out POS tests with several different suppliers. National is developing its own POS system. Kroger is another target.
 - Among mass merchandisers, K-Mart is installing a satellite system to



centralize store information and speed POS authorizations. Zayre is another target.

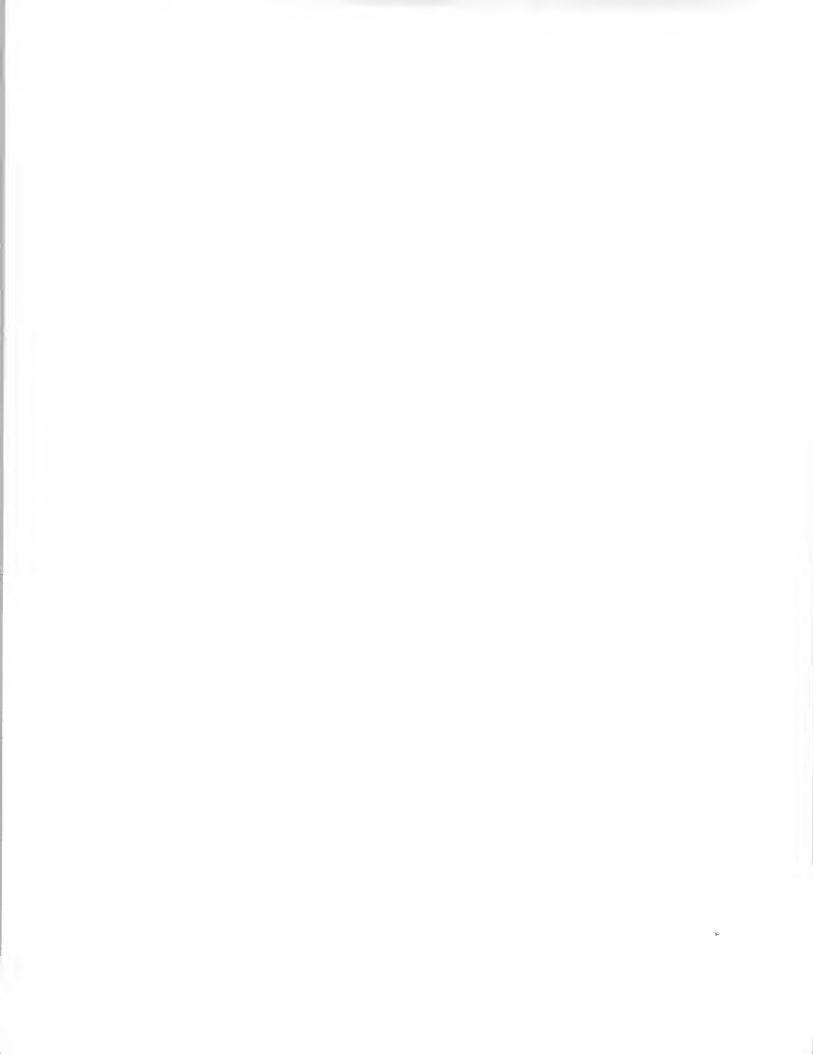
- Among general merchandisers, Limited, Federated, and May department stores have all indicated new application test programs are underway.
- Major marketing opportunities.
 - Leverage G.M.'s internal EDI system for parts suppliers into a major food chain.
 - Food stores are a market already conditioned to EDI due to earlier positive efforts.
 - Food stores are already collecting product data at POS via scanners.
 - Food stores have good inventory status systems in place for ordering input.
 - Applications services aimed at franchise management firms will provide excellent marketing leverage to reach smaller retailers and service providers.
 - As a first step to penetrate mass and general merchandisers, EDS could set up a development project to tie a major chain's POS system into EDI.
 - Another opportunity is to propose building an integrated marketing/merchandising data base for a large retailer and then assist them with application development, e.g., telemarketing and in-store promotions. Food stores are an immediate target.



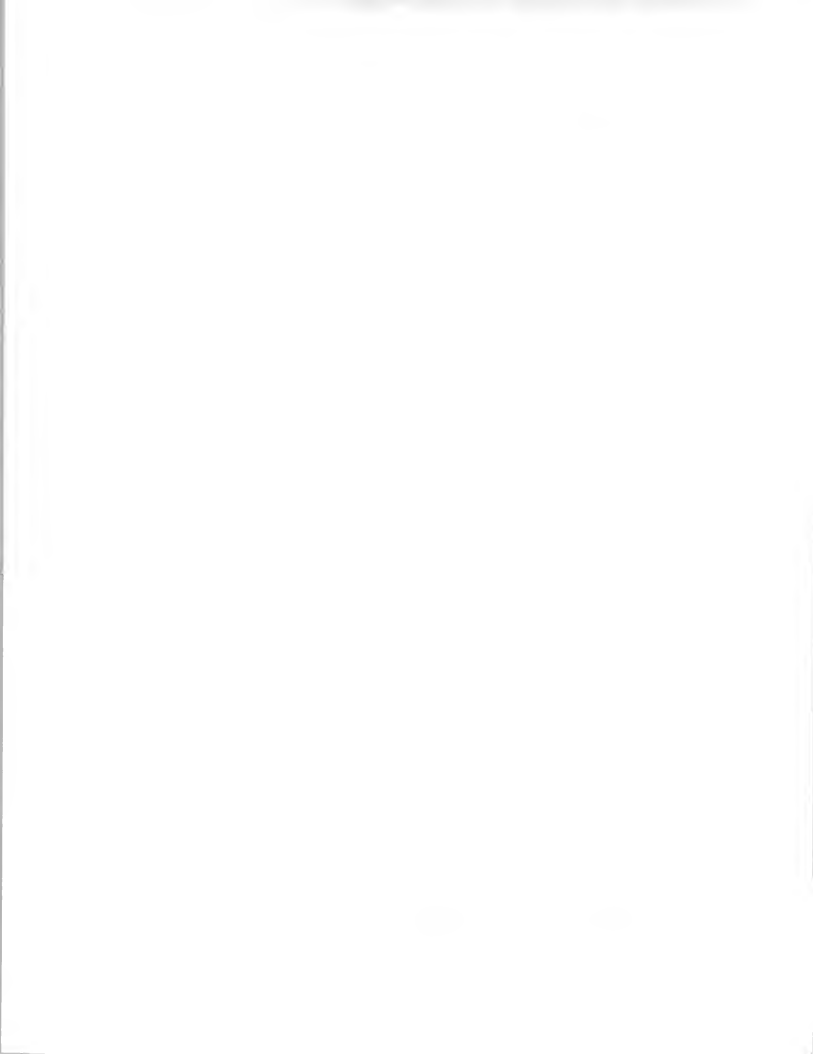
VI WHOLESALE DISTRIBUTION INDUSTRY SECTOR

A. INDUSTRY ENVIRONMENT AND DEMOGRAPHICS

- Grocery and food distributors represent the largest sector (about 25-30% of all wholesaling).
- Other major sectors in wholesaling include:
 - Auto parts.
 - Hardware.
 - Electronics.
 - Paper products.
 - Machinery.
- Industry revenues in 1987 are \$1.4 trillion. There are over 320,000 firms in the industry.
- Local and regional organizations now dominate the wholesale sector; increasing consolidations will gradually lead to larger, more widespread firms over the next 5-10 years.
- Revenues are highly concentrated at the top: 2% of the firms generate 50% of revenues. These typically have multiple sites, very large numbers of inventory items, and (except for food distributors) higher cost items in that inventory.
- Independent distributors will be under increasing competitive pressure from outside sources.



- Retail mass merchandisers are gradually absorbing the distribution function via EDI.
- EDI also encourages direct connections between retailers and manufacturers, thus reducing the need for a "middle person".
- Overall industry growth is only about 2% annually, and structural changes in distribution channels with large growth rates low. Durable goods will grow at a 4% rate, while non-durables actually have a declining growth rate.
- Even more than in retailing, the need to achieve operational efficiencies and cost savings is paramount. This includes:
 - Lowering inventory requirements (storage costs can be up to 40% of inventory value).
 - Maximizing customer service and order fulfillment while keeping inventory costs low.
 - Cutting paperwork in order processing (up to 17 separate forms may be needed to process an order).
 - Optimizing order delivery and transportation costs.
 - Optimizing distribution facility location to better serve customers.
 - Most firms have already automated basic requirements: order entry, invoicing, inventory control, and accounts receivable.
- Improvements in forecasting based on use of product sales information captured at the point of sale by retailers will contribute to improving wholesale sector operations as well.
- The pressure for operational improvements may be so great that wholesalers will offer demand planning services and support to smaller retailers.

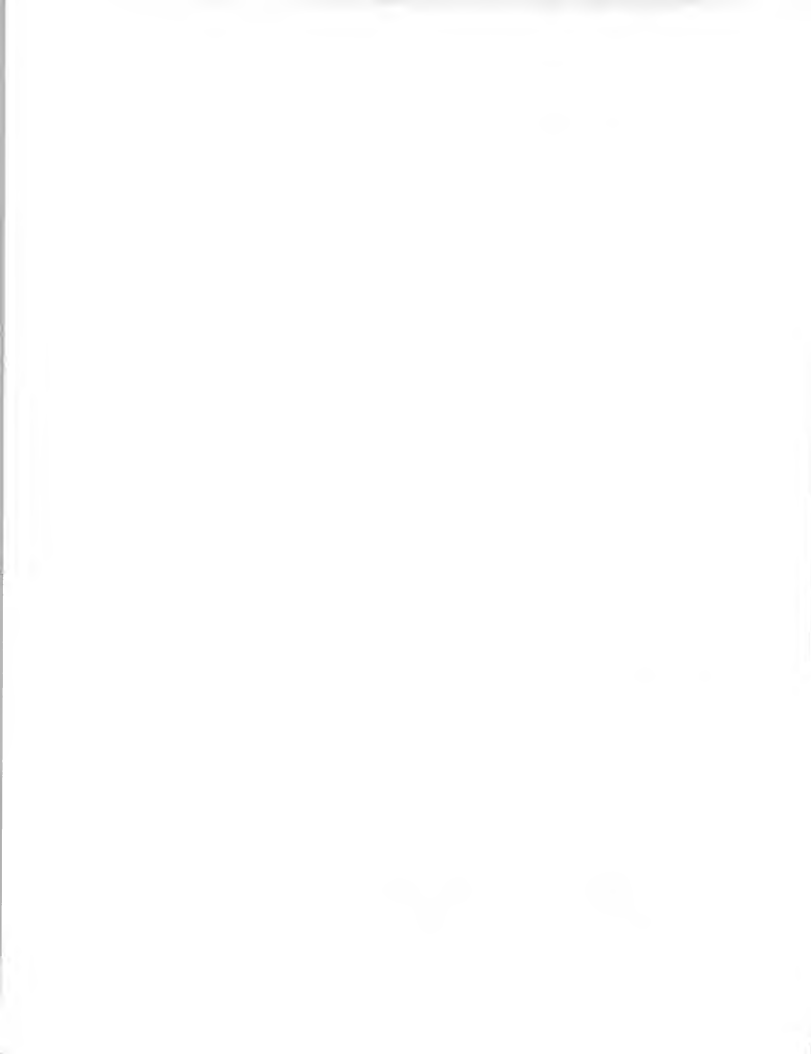


- Like retailing, wholesale is in a "catch up" mode for IS investment. However, increases will be gradual due to two factors:
 - Economic trends/cycles directly impact wholesalers causing a conservative approach.
 - Overall low profit margins (2-3%) set up pressure for assured operational marketing improvements before investing.
 - Many smaller firms cannot afford significant expenditures for automation beyond basic needs.

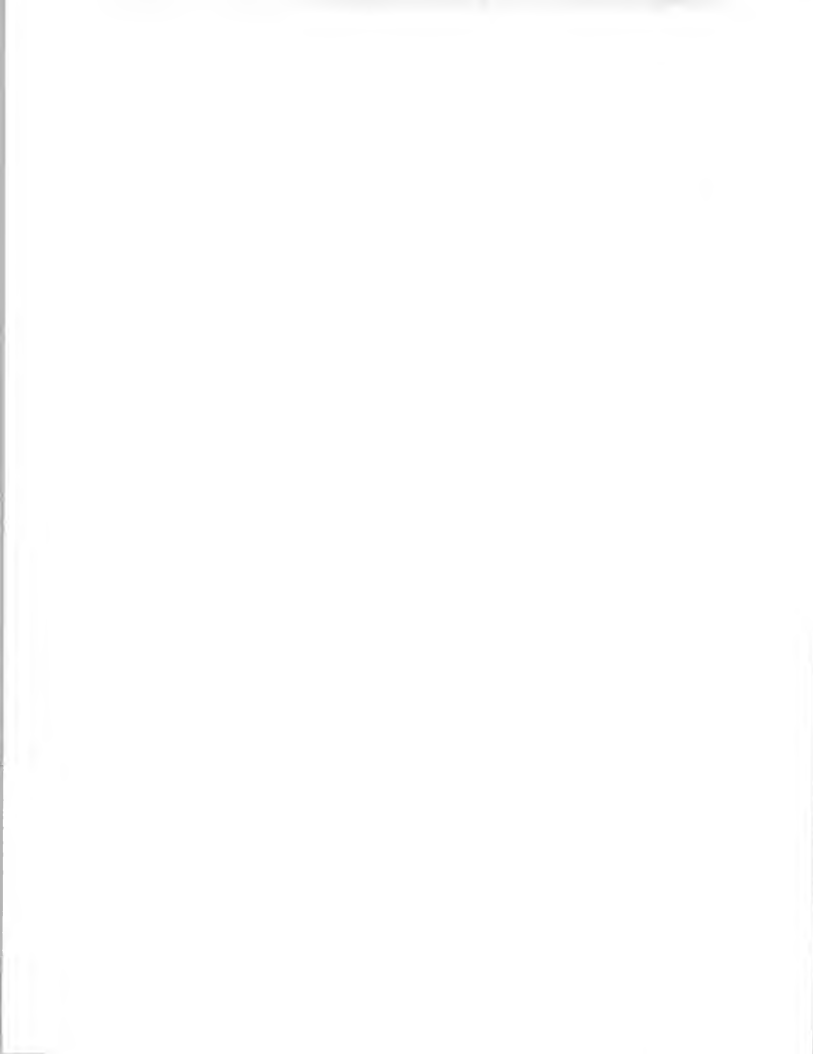
- Generally wholesalers spend up to 1% of annual revenues on IS.
 - This is low among all industries where the average is about 2%.
 - Outside service expenditures are also below average. Service expenditures are growing only at 6%. Turnkey systems (18%) and application software (26%) are more attractive segments.
 - Communications is a major area for expenditures increase due to EDI and automation of other linkages to retailers.

B. APPLICATION NEEDS

- EDI Systems are a development target for major wholesalers.
 - EDI systems eliminate much paperwork flow involved in order processing and delivery schedules.
 - Retailer computers can talk to wholesaler/manufacturer computers to place orders and exchange delivery information; payment information and settlement could be added.

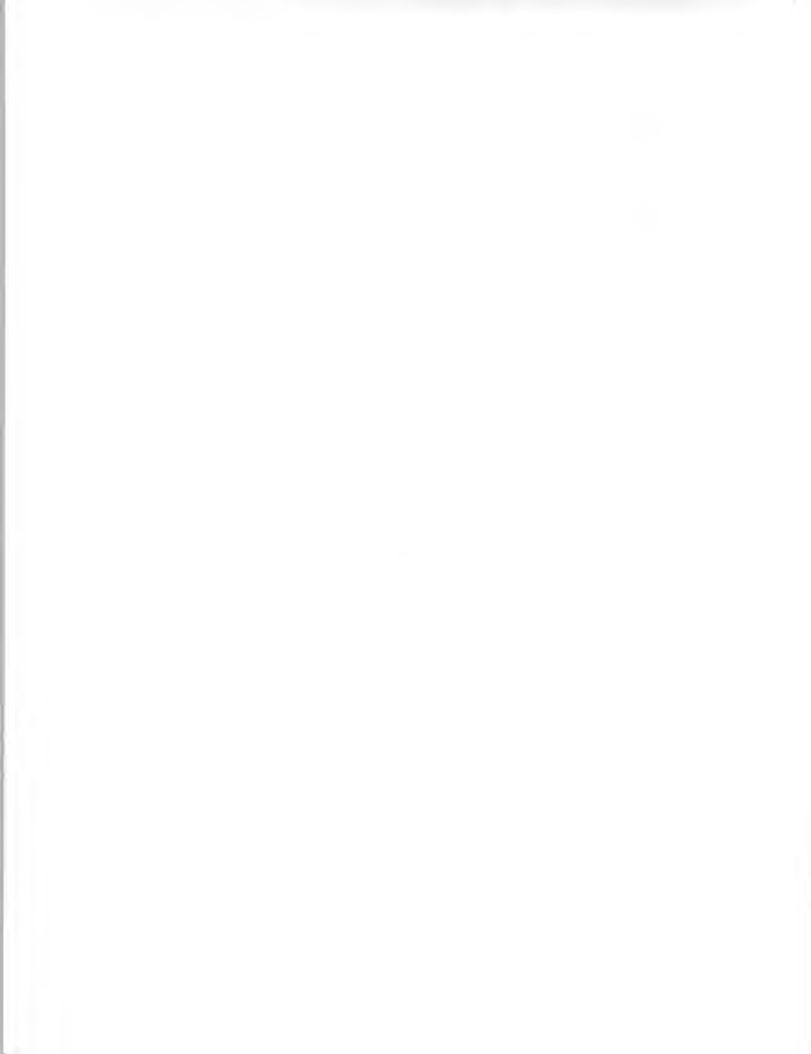


- Most EDI activity is concentrated in the food sector, but the potential is strong in other non-durable product sectors as well (e.g., drugs, auto parts, hardware).
- Major wholesalers are also investing in new marketing systems to improve revenues and profit growth.
 - There is a growing opportunity for non-durable goods wholesalers to develop inventory replenishment systems uniquely suited to individual retail customer needs and practices.
 - The Japanese have successfully implemented such "just in time" systems.
 - Computer models compute shipment size and delivery information based on retailer's sales and marketing data.
 - Wholesalers involved in international distribution can especially benefit. GEISCO has implemented a worldwide order processing network for automobiles. Toyota branches on every continent order parts and automobiles direct from Corporate Headquarters in Tokyo.
- Major wholesalers are also planning to develop Distribution Resource Planning (DRP) programs.
 - These programs automate purchasing, storage, and retrieval in and among warehouse facilities often on an international basis. Computer calculated size and frequency of inventory replenishments is the major benefit.
 - Retail sales forecasts and POS data are key inputs along with shipment histories and inventory levels.
- Time-phased inventory. For firms processing customers' "master orders": covering an extended period, time-phased inventory systems will become more important. These allow distributors to commit, on a real-time basis, firm



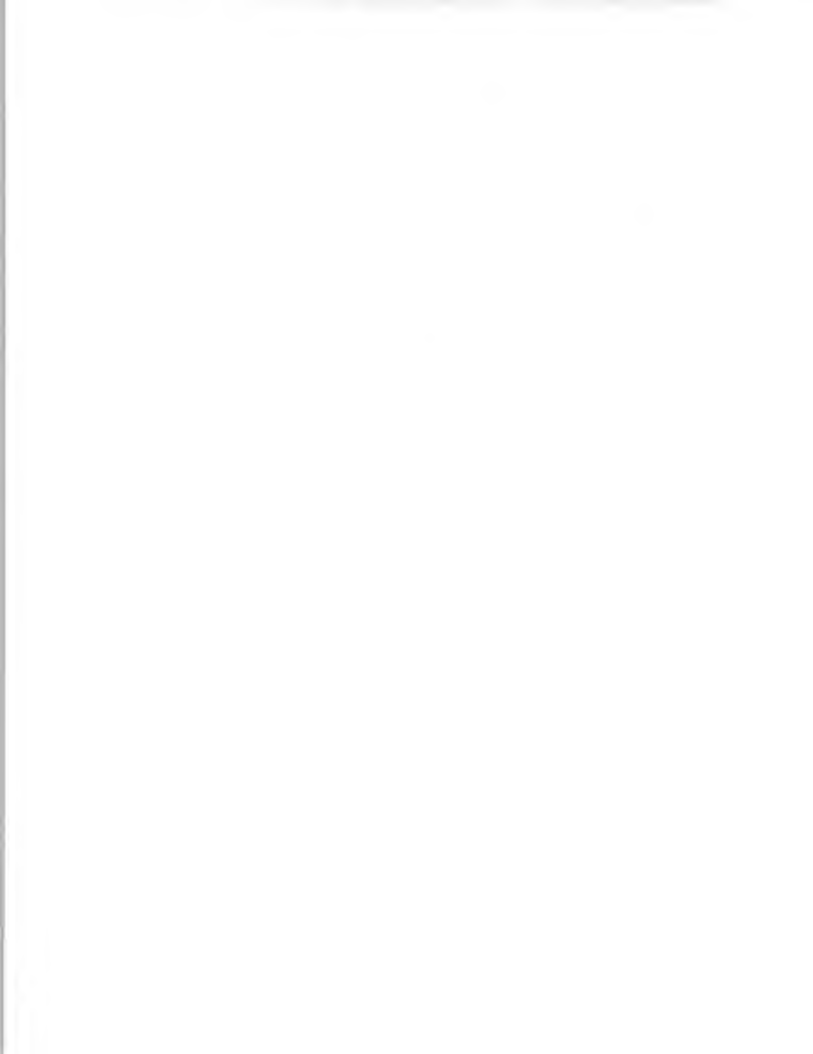
dates for a number of shipments over a period of months. Such systems have high value for distributors who import their products, must build in long lead times, and still require instant confirmation of shipping dates to the customer.

- Like retailers, wholesalers will make major investments in enhanced communication systems.
 - Automated links with retailers and POS devices are a key driving force.
 - Larger wholesale firms need to install, upgrade, and expand internal data communication networks to implement EDI and DRP programs. International organizations can especially benefit.
 - Existing data networks are too limited to carry the load of the new systems.
- The automation of warehouse operations, for order picking and filling, has potential for labor cost reduction and more effective operation in a competitive climate. Only larger distributors with huge inventories, and multiple warehouses can justify this investment.
- Distribution Network Management (DNM) optimizes the costs of delivering freight to many locations in several modes. DNM works in conjunction with DRP, adding a transportation component to operational analysis.



C. APPROACHES FOR EDS

- Several large wholesale chains, as well as at least one industry trade association, are actively planning new applications, such as discussed above. These organizations represent initial market development targets for EDS. Examples include the following:
 - In the grocery sector, the California Grocers' Association, under the name of Food Business Network, has been studying an information exchange and POS payments authorization system for several years; the system would link individual stores with chain headquarters, wholesalers, and POS authorizers. Wettreau is another food wholesaler active in new applications.
 - In the auto parts sector, NAPA and several other major regional auto parts distributors are known to be specifying EDI systems.
 - Among hardware stores, national chain operators, such as ACE and True Value, are building centralized EDI systems that link their individual stores with wholesale distributors and manufacturers.
- Major consumer electronics firms such as Radio Shack and Circuit City represent excellent targets for integrated order entry and inventory management systems using DRP techniques. Firms with international operations would be especially good targets.
- EDS could develop an EDI system for the wholesale grocery industry.
 - The market is already conditioned.
 - Food retailers are rapidly installing product data collection systems at POS.



- EDS could work with a major retail chain to link the chain's POS transactions data base into a wholesaler's EDI system to initiate an automatic ordering system as a first step toward penetrating the wholesale sector.
- EDS could help a major wholesaler develop a "just-in-time" ordering and delivery management system for a large food store chain. This would lower inventory carrying costs, improve delivery schedules and improve customer services for both wholesaler and retailer.
- Due to their very large inventories, auto. parts wholesalers need advanced inventory control/management techniques. This may be difficult (or easy) for EDS because of its GM relationship.
- Given EDS's approach to other industries, focus on only the largest national or regional chains is recommended. Smaller institutions will not produce revenues that will be significant to EDS, unless they are part of a franchise operation. Franchises are potentially very attractive.
- Several of the sub-sectors have a vendor who is well positioned and who has already made the investment to operate that market. Acquisition could position EDS more rapidly in such markets with a dominant position from which to build on.

